COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER AND R. DAWSON HALL, *Editors.*

Volume 19 NEW YORK, THURSDAY, MARCH 17, 1921 Number 11

Restoring the Reputation of American Coal

TWO years ago representatives of the coal trade met with officials of the Shipping Board at Washington to discuss a program that would give the new coal export business full opportunity with vessels flying the American flag. On that occasion much was said about protecting the name of American coal abroad by upholding quality. Everyone who attended that notable meeting was of one mind—that permanency of American coal in foreign markets depended on our ability to build up a name for the quality of our coals. No concerted effort followed. The Shipping Board and State Department, both interested in the development of foreign coal business, were in no wise able to insist on the shipment of clean coal, and when the demand abroad was greatest in 1920 coincident with ample shipping, anything that was black was shipped on foreign account. By no means all shipments were off grade, but sufficient pool 18 was shipped on pool 1 business, or buckwheat No. 3 for gas coal, to give our product a very bad name in Europe.

It is, therefore, with much interest and many wishes for success that we chronicle this week official announcement of the contract between the Tidewater Coal Exchange, Inc., and the Bureau of Mines. This contract, which is the second of its kind, the first having been with the Sewalls Point Exchange, has for its purpose the standardization and purification of the classified tidewater pools through disinterested and authoritative sampling and analysis of commercial shipments from the mines shipping through the tidewater pools.

It has become common practice to trade in coal by pool numbers. Although designed for Tidewater business, shippers quote pool coal to line trade, and it is understood that a number of mines are classified and given pool numbers that have never shipped coal to the piers. Operators outside of the exchange have been known to make quotations on shipments "as good as" or "equal to" certain pools. Pool 1, pool 9, pool 18, etc., have definite meanings in the trade. The use of these pool numbers is a form of standardization that if well done will react to the credit and benefit of a large number of those in the Eastern field. For instance, a buyer was considering last week the quotations of a responsible and well-known shipper of smokeless coal and of a shipper through the Sewalls Point Exchange who quoted pool coal. Had the reclassification of the mines on the Virginian based on the sampling done in co-operation with the Bureau of Mines been completed, the buyer would have placed the business with the member of the exchange because of lower price. The experience of this buyer with the present Tidewater classifications makes him wary of the coal he is likely to get.

Building up the reputation of the pools for pure coal, whatever quality they may be supposed to represent, is going to be very slow. Months will be required for sampling shipments from the various mines—there being more than eighteen hundred now listed by the Northern exchanges. A great deal of time will be required for the study of results before the exchange can benefit from the work of the Bureau of Mines. The outcome, however distant, cannot be other than beneficial to the members of the exchange and to the American coal trade generally. It is just as well to recognize that whether the fault lie with the classification or with the preparation at the mines, consignees in the last year have not been getting the quality of coal supposed to be represented in certain pools, and the pools, to some extent at least, have been living on their reputation. As an earnest of good faith the solicitation by the Tidewater Coal Exchange, Inc., of the help of the Bureau of Mines will go far toward permanently establishing the prestige of the exchange here and abroad, and the participation of the Bureau of Mines is an entirely welcome form of venture by the government in business.

Upper Silesian Coal as a Peace Bond

UPPER Silesia as a prize probably is as important in settlement of the German reparations as any other single feature. A vote is to be taken this month as to the disposition of this territory, and on the result of this plebiscite will depend the future ownership of coal reserves representing 40 per cent of those of pre-war Germany. Edwin C. Eckel, writing in the *Annalist* of March 7, 1921, thinks that the possibility of Germany being able to make large and steady payments in reparation depends to a very large extent on her retention of this important coal area. He says: "If Germany retains this area her economic position will be approximately that of June, 1914, and she can pay accordingly. But if the plebiscite in Upper Silesia ends in favor of Poland, then we may as well prepare to accept certain economic consequences, for while control of the Upper Silesian coal fields will give Poland a real chance to become a manufacturing country on a very large scale, its loss will paralyze the industry of central and eastern Germany." He characterizes the coal and iron ore reserves of Germany as assets on which an indemnity bond issue might have been based, and points out that the loss of the entire Lorraine iron ore tonnage and the Saar coal reduced by so much—at least half, in his opinion—lessens the real security behind such an issue.

In 1914 the mines of Upper Silesia produced a little more than 37,000,000 tons of coal, or about 37 per cent as much as the Ruhr. The coal here produced is used mainly for gas and byproducts and as fuel for the heavy chemical industries of Silesia. It is pointed out that the transfer of Upper Silesia to Poland will, in point of reserves, reduce Germany to a position a little bet-

ter than Great Britain and place Poland in third position in Europe.

A German indemnity bond, backed by the pledge of the Lorraine ores and Westphalian and Silesian coal fields, according to Mr. Eckel would be a good investment. As against that the bond of a Germany lacking iron ore and short of coal would be entirely worthless, in his opinion.

It is small wonder then that in the course of the negotiations on March 1 the Allies refused to discuss the German proposal that was based primarily upon the unqualified retention of Upper Silesia by Germany. According to Mr. Eckel's figures, Upper Silesia in the hands of Poland will make for the industrial and commercial power of that country but without affording France an asset on which to collect reparation payments.

Stewart on Mine-Labor Efficiency

SOMEONE has been defaming the efficiency of the pick miner both in this country and in Great Britain. At least that is the inference to be drawn from the signed editorial by Ethelbert Stewart, U. S. Commissioner of Labor Statistics, in the February number of the *Monthly Labor Review*. Mr. Stewart's statements appear as an introduction to tables of statistics of 9,817 pick miners out of some 360,000 men "who really produce the coal," showing a very specialized study of days worked and tons actually loaded by these men. He has gone far out of his way to criticise adversely the data on labor statistics in the coal industry published by the U. S. Geological Survey and, while it is patently not necessary to defend the Survey's methods or data, some may take Mr. Stewart's remarks at their face value because of his official position. Comment on some features of his contentions are not, therefore, amiss. His errors in interpreting his own as well as the labor statistics of the Survey we may lay to his enthusiasm over a subject that is strange to him.

He begins by attacking as unreasonable and unsound the customary use of the figure obtained by dividing the total tons of coal produced by the men—(tipple) days as an index of labor efficiency. He appears to be thinking of none but miners (tonnage men) while he is discussing the figures of others that are concerned with total mine employees. He will search in vain in the reports of the Geological Survey for any reference to this figure as showing the relative efficiency of the *miner*, for it is well known, and was fully demonstrated by F. C. Honnold in his testimony before the Robinson commission, that it as in the day labor that inefficiency developed during the war.

Mr. Stewart points out that because certain mines are becoming deeper and therefore require more "track laying, track repairing and doubtless much additional underground labor of other kinds," the indirect labor is increased and the average output per man per day is lowered. He overlooks the fact that even during the war period there was no diminution in the development of new mines and that there is no reason to suppose that the number of mines abandoned was any less during that period or is any less now than it has been in years past. If the increased output of 1918 or 1920 had come from the same mines that were in operation in 1916, there would be some point to his argument, but in point of fact the greater production came from several thousand new as well as the old mines, and in the new mines the actual requirement for day labor is much lower than in the old, deep workings.

He admits that "actual average daily production per miner is unknown and unknowable in the present condition of [mine] record keeping." He might have added that it will continue to be unknown as long as the miners' union is able to keep time clocks off the works. He further says that "output [per miner] may be increasing or decreasing; nobody knows. What is known is that the proportion of underground non-miners and above-ground men to actual miners is increasing——." On the contrary, there is no reason for arguing that because this proportion increased from the beginning of 1917 to the end of 1918, it has continued or will continue to increase. In fact, the causes for this increase as set forth in the Survey reports on coal ("Coal in 1917," page 931, and "Coal in 1918," page 714), as quoted by Mr. Stewart, ceased to operate for a period in 1919 and are inoperative now. An investigation of labor at work in the coal mines today would show an increase over the war period in the proportion of miners to indirect labor.

The explanation offered in the Survey reports for the relatively greater increase in non-productive labor, namely that "the demand for coal was so great and the prevailing market price of coal so good that operators exerted every effort to increase their capacity and output" and that the "most certain way to increase capacity is to put on more men," an explanation lightly put aside by Mr. Stewart with the statement that it "is one that could scarcely have emanated from a practical coal operator," nevertheless is the explanation offered by the leading bituminous coal-mining engineer in the country as well as by one of the best informed of the larger soft-coal operators, nor does the Labor Bureau statistician offer any other explanation of his own, except to say that the increase of 21 per cent in the number of men employed in the mines in 1917 was needed to get cars, not to get coal. His understanding of the subject should be broadened to include a knowledge of the fact that in 1917 and until late in 1918 cars were needed to get coal.

Mr. Stewart appears to object to the use of "tipple" time in recording mine and labor operations. No one has asserted that tipple time should be the standard; it happens that this is the only mine record of length of daily operation that can be universally obtained. However contrary to Mr. Stewart's understanding, it is more often true than not that mine-operating time is greater than tipple time. In other words, it is generally true that the coal can be dumped over the tipple at a greater rate than the miners can load it into mine cars.

It is only after one has labored through the writer's tirade on all other statistics of coal-mine labor that he finds at the end material that relates to the subject of the article, "Tonnage Output Per Pick Miner Per Day" and finds new and interesting data, lacking, however, in one very important essential, and one that could as well have been added. Figures are given showing the average days worked by the pick miners, but with no reference to the relation of this number of days to the number of days each man was given opportunity to work. Mr. Stewart has, perhaps unconsciously, been unfair to the very pick miners he so earnestly defends. As presented, the figures show that but 150 of the 9,817 pick miners worked thirteen or more days in the half month, and as a natural consequence the way is left open for the inference that the remainder of the men must have been loafers.

Coal-Pillar Drawing Methods in Europe*

Longwall Is Prevailing System of Mining Followed—Where Pillars Are Made They Are Comparatively Large and Are Extracted by Successive Splitting or Slicing—A Recovery of About 95 Per Cent Is Thus Attained

BY GEORGE S. RICE†
Washington, D. C.

IN MOST of the coal mines of Continental Europe some one of the various forms of longwall mining is generally chosen as the means of extraction. Longwall methods are followed also in Great Britain wherever the coal is weak and friable, wherever the coal bed provides material for pack walls and filling, wherever the bottom is soft and heaves easily, wherever the roof is pliable, wherever the bed is thin and brushing provides building material, or wherever thick multiple seams are mined in layers, as is the case in the 24-ft. seam in Weymss, Scotland, or the Ten-Yard pitching bed near Coventry, England. Pillar methods have been retained in British fields wherever the coal beds are from 5 to 9 ft. thick and wherever (the coal being free from heavy partings and binders or draw slate) no waste rock is provided for pack walls, or where the roof is hard and must be shot to bring it down. These methods are used also where the bottom or floor is comparatively hard.

The room-and-pillar system, by which probably 95 per cent of the coal of the United States is produced, is now used in only a few Welsh mines, where it is known as the pillar-and-single-stall method. The American room-and-pillar system is not equivalent to the bord-and-pillar or stoop-and-room method. The essential difference between the bord-and-pillar and the average American room-and-pillar system probably arises from the difference in conditions here and in Europe. The coal in most of the mines in the United States is at a depth of less than 700 ft., whereas the bulk of the coal mined in Europe lies under a cover of more than 1,200 ft., and the deepest mines in Great Britain, Belgium, and France reach depths of 3,500 to 4,000 ft. In deep workings roof spans of great width cannot be safely provided even with the use of abundant timber. As the mines in the United States become deeper, conditions will become increasingly like those in Europe and the rooms will become narrower and the pillars thicker, and the bulk of the coal will be extracted on the retreat.

LESSORS AND LAWS DEMAND CONSERVATION

It is generally conceded, without reference to the cost of production, that the larger the pillars left on first mining, the more thoroughly can the coal be extracted. In Europe the operators are compelled either by the lessors or by the governments to make a complete extraction of the coal, whereas in this country the competitive cost of production or the necessity of giving support to the surface, as in the flat farming districts of the Middle West, has largely determined the character of the measures taken to provide for the complete extraction of the coal.

Generally the more complete the extraction of a coal deposit, beyond 70 to 80 per cent, the higher will be the cost of production, as to obtain such a result either more extensive timbering is necessary or packs and walls have to be constructed. The longwall system practically removes all the coal in the seam but at a cost of production greater than by the room-and-pillar system, for in the former a large amount of deadwork has to be done. On the other hand, with heavy overburden, accompanied usually by friable coal and roof, it is often the only system that can be used.

The wasteful methods of room-and-pillar mining which in earlier years were practiced in the United States have been difficult to overcome, parly because the miners' contract prices have been determined largely on the basis of wide working places, wide crosscuts between rooms and narrow pillars. These agreements and the

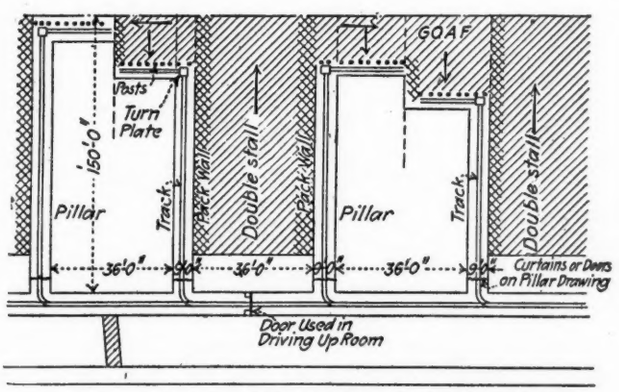

FIG. 1. PILLAR AND DOUBLE-STALL METHOD

A method not uncommon in the United States except in the use of the pack wall. Mr. Rice does not say so, but experience in central Pennsylvania is not favorable to the leaving of any pack walls or weak pillars in the goaf, as they prevent the complete collapse of the roof of the goaf which should occur as soon as the main pillars are withdrawn. Note the use of the turnplate at pillar ends.

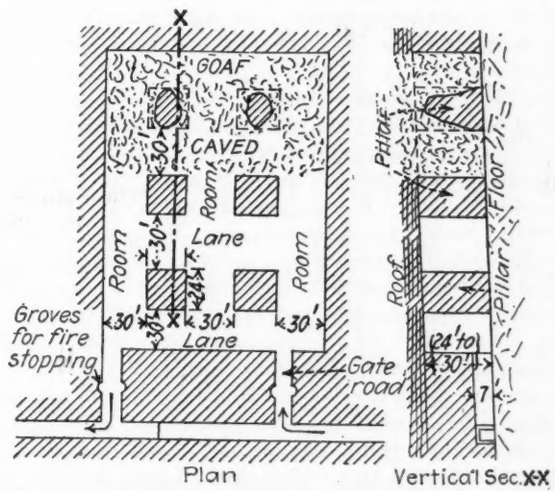

FIG. 2. SQUARE CHAMBER METHOD USED IN SOUTH STAFFORDSHIRE MINES

This method consists practically of driving a large three-road room with two necks. As the place is excessively wide, pillars are left in the heart of the room, which are saved as far as possible when the room is abandoned.

*Presented by permission of the director of the U. S. Bureau of Mines before the meeting of the American Institute of Mining and Metallurgical Engineers, New York, Feb. 15, 1921.

†Chief mining engineer, U. S. Bureau of Mines.

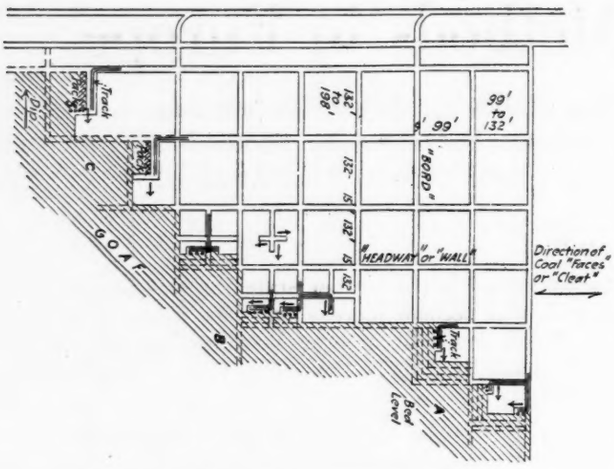

FIG. 3. BORD-AND-PILLAR METHOD

In this system first mining is reduced to its lowest proportions. Barely more than a tenth part of the coal is taken out in the advance. As shown here, the breaking line is not by any means straight and some unnecessary waste would inevitably occur, especially in section C.

customs and usages that have been established are hard to change when the mining proceeds under heavier cover or more complete recovery is demanded by the owners of the coal fee.

The pillar systems used in Europe may be classified as follows: Pillar-and-single-stall, pillar-and-double-stall, the square-chamber method of South Staffordshire, bord-and-pillar (or stoop-and-room), rooms or bords hydraulically sand-filled.

Room-and-Pillar Method Rare in Europe

Pillar-and-single-stall, the equivalent of the American room-and-pillar, is used in a few places in Wales. I observed it in the Craig Merthyr colliery, in a slightly pitching shallow anthracite bed 5½ ft. thick having a strong roof. The stalls were 27 ft. wide, and the pillars 18 ft. thick. The pillars were extracted by the methods generally used in American mines, starting at the inner end and bringing back a block of pillars simultaneously.

In Upper Silesia, room-and-pillar methods of ordinary type were used extensively in beds 10 to 60 ft. thick; but, owing to the extensive fires and to the trouble from the subsidence of the surface and to the imperfect recovery of the coal usually attained, these systems have been supplanted by longwall and hydraulic sand-filling methods.

The pillar-and-double-stall method was formerly used in Scotland, and in 1911 was adopted in Wales at the Seven Sisters colliery in an anthracite bed 7 to 8½ ft. thick. The stalls were 42 to 48 ft. wide and the pillars 36 to 48 ft. wide. In this system, as shown in Fig. 1, the stalls have two entrances, and the tracks are set at either rib, the excavation between the tracks being gobbed. When the stalls have been driven up to the next entry or level, they are widened on either side and slices about 10 to 18 ft. wide are taken back. Sometimes a thin pillar is left between stalls, but this is lost. The average recovery is said to be about 90 per cent. Gradually the system is being supplanted by longwall. This method of mining was formerly used in Appanoose County, Iowa, in a 30 to 36-in. bed of coal, but the thin pillars were not generally recovered; the system even there has been largely replaced by longwall.

The unusual square-chamber method of South Staffordshire, shown in Fig. 2, was developed to mine the so-called Ten-Yard seam, which lies approximately horizontal. The chambers, which are separated by thick pillars, are 138 ft. wide and as much as 200 ft. long, arranged with four to six internal coal pillars. They are opened with two narrow gate roads off the level. As the coal is liable to fire spontaneously, arrangements are usually made for fire dams, grooves being cut in each rib of the gateway and clay being placed conveniently at hand. These gate roads are connected by a "lane" 30 ft. wide. Stalls or rooms 30 ft. wide are driven at 24-ft. intervals extending the gates and at every 24-ft. interval there are similar cross lanes 30 ft. wide, thus leaving internal coal pillars 24 ft. square.

Top Coal Is Taken Down In Section

This mining is in the bottom coal, which is from 7 to 8 ft. thick. After the chamber is formed, the top coal is taken down in sections, slice after slice being removed vertically, by cutting vertical grooves successively every 6 ft., leaving "spurns" or narrow webs holed through, in the upper part. When the layer of coal that is being extracted is thus cut, the spurns are reduced by pick and finally knocked out with a "picker," which is an instrument similar to a boathook.

It is so managed that the mass falls as a whole and the coal is then loaded. Thus the work continues until the roof is reached. The internal pillars are then sliced away as much as possible before the roof falls. Necessarily more or less coal is buried by the falls. The thick pillars between chambers are extracted after the ground has settled.

No appreciable amount of methane has been found in these mines during the past hundred years of working, although the bed reaches a depth of from 1,200 to 1,500

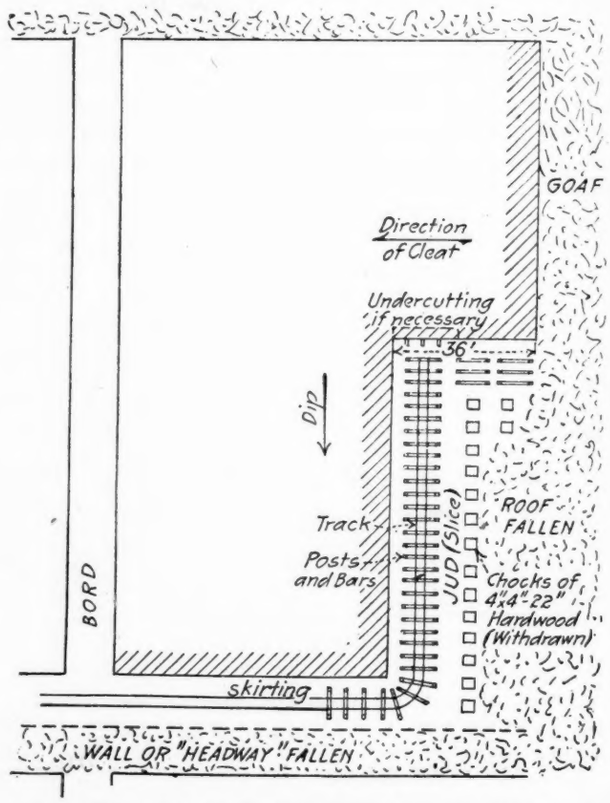

FIG. 4. DETAILS OF PILLAR EXTRACTION, BORD-AND-PILLAR SYSTEM

Exhibits how the work of drawing pillars is performed when the roadways fall and become filled with rock. Skirtings are driven along the face and juds at right angles thereto.

ft. The mine is worked with open lights and sometimes with candles. The chambers and roadways are dusty, but it is said that no explosions have occurred in this field except during the war, when one resulted from blasting. The infrequency of explosions, apart from the fact that the coal is not of a highly inflammable character, probably is due to the restricted use of explosives, the coal mainly being extracted by pick and bar.

Bumps Are Collapses of Upper Measures

An unusual feature in the operation of the coal in the south Staffordshire field is the occurrence of "bumps," which apparently arise from the breaking of the strong overlying rocks that for a time are able to span the large underground subsidences which have been caused by the mining of coal. When these rocks break they jar the roof immediately above the coal seam, which falls and smashes timbers. Generally there is some preliminary dribbling of rock from the roof, which warns the miners, so that comparatively few serious accidents have occurred from this cause. A similar condition prevailed in a mine at Fernie, in British Columbia, but there the bumps caused much loss of life. In that mine the condition has apparently been overcome by driving entries that divide the coal area into large pillars, as in the bord-and-pillar system, thus removing only a small percentage of the coal in first mining. The rest of the coal will be recovered later by what is equivalent to a longwall retreat.

In the south Staffordshire field the yield of coal by first mining is quite low yet in spite of the large number of remaining pillars much coal is lost by the caving of the roof. It requires skilled workmen and does not appear to have advantages that would commend it for use elsewhere.

In Europe the bord-and-pillar (or stoop-and-room) is the most important system in which pillars are used. It is common in the north of England, in Scotland, and to a lesser extent in Wales; in a modified form it is used in the Upper Silesian field in connection with hydraulic stowage. (See Figs. 3, 4, and 5.)

In the typical bord-and-pillar systems narrow places are driven at right angles to one another, forming large square or rectangular pillars that are extracted when the workings reach the boundary. With the best of conditions this is essentially longwall retreating and is then an admirable system. Little or no explosive is required, as the coal "facings" are usually close together in European coal beds, and pick work takes the place of powder.

Bord-and-Pillar for Thick, Level, Clean Coal

Formerly this system was used almost universally in the flatter beds of Great Britain, but gradually longwall advancing supplanted it until now probably over three-fourths of the coal produced is mined by this latter system. The bord-and-pillar method is used in the same districts as is the advancing longwall and sometimes in different beds of the same mine. It is considered especially applicable, in fact necessary, where the coal bed is approximately horizontal or not dipping over 1 in 3, has a medium thickness (4 to 10 ft.), is free from thick partings, and the roof is strong and not flexible or bending in character. Conversely, longwall is used where the room is weak or flexible or where the coal bed is comparatively thin (under 4 ft. thick) or where it is thick and there is a soft underlying clay, or where

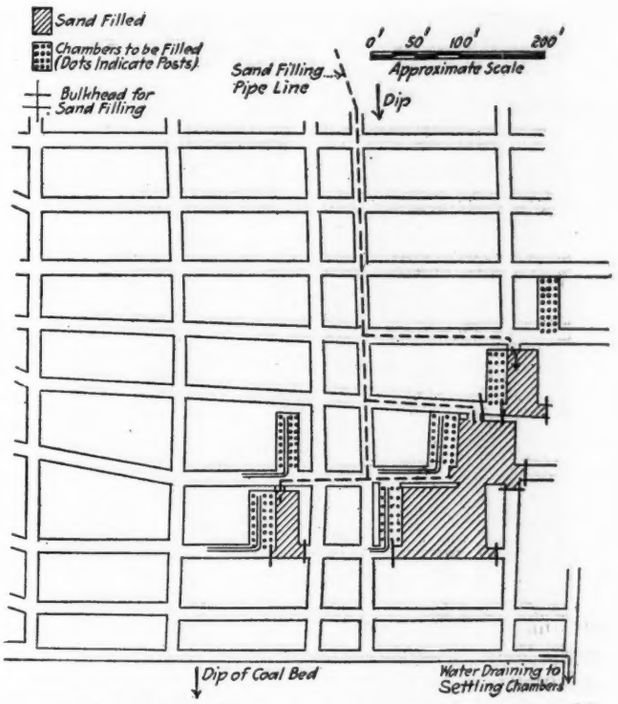

FIG. 5. BORD-AND-PILLAR METHOD WITH SAND FILLING
Coal is taken out in horizontal slices, and as it is removed sand is flushed in to take its place. This method prevents spontaneous combustion and permits of complete extraction.

the bed has thick partings that can be used for pack walls.

While the bord-and-pillar practice has not been standardized, it is probable that the deeper the workings, the more necessary it is to have pillars the dimensions of which are large when compared with the width of the surrounding working places. The essential feature of the system is to drive "headways," or what in the United States would be termed butt entries, about 9 ft. wide advancing on the ends or butts of the coal, and from these are turned off bords, or rooms, 9 to 15 ft. wide advancing on or at right angles to the facings of the coal.

First Mining May Take Only Tithe of Coal

A typical case is at the Eppleton colliery near Durham, England, where the mines operate three coal beds which lie practically horizontal at depths of 1,008, 1,050 and 1,170 ft. and have thicknesses of 7 ft. 4 in., 6 ft. 10 in., and 3 ft. 8 in. respectively. The pillars vary from 99 x 132 ft. to 198 ft. square. The headways or walls which are driven on the butts are 9 ft. wide, and the bords, which work at right angles to the coal facings, are 15 ft. wide. In forming the pillars, therefore, only 10 to 17 per cent of the coal is extracted. The final recovery on the retreat is large, the claim being made that 95 per cent of the coal ultimately is recovered.

The pillars are extracted in various ways, but in general when the boundaries are reached, the pillars are brought back on a stepped diagonal line. The pillars to be drawn are split by a headway and a narrow bord, making four smaller pillars, then these are split or successively sliced off on the goaf side. Where, however, the roof is of a character that breaks short, slices are taken off the sides of the headings working toward the goaf. Where the roof is poor, it is sometimes difficult to make complete recovery, and the small corner stumps left for protection are lost.

The system in general is admirable, the recovery of

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ALMOST A HALF MILE BELOW GROUND

In the Ludwigschaft mine 2,275 ft. underground. Apparently no slicing method is in use at this mine. Perhaps the exigencies of war are to blame for the change. High cars and narrow are used, which may be suited to metal mines, but are ill suited to coal mines, where an important desideratum is coal not broken in loading.

the coal being only slightly inferior to that which longwall advancing affords. It is not, however, well adapted to the use of mining machines and no instances have been brought to my attention where coal mined by this method is cut by machinery. In the withdrawal of individual pillars slices are taken off the goaf side, lines of breaker props are sometimes used and withdrawn, in other places cogs are employed. In general it is expected that the timber will be almost completely recovered. In some instances when the pillars and the workings are old or the room or floor is not strong, the headways and bords become filled, in which case it is generally cheaper to drive new places alongside them. These are called "skirtings" and "jenkins," respectively, in the Durham district.

Objections to the bord-and-pillar system are the large amount of narrow work driven at the start of operations, resulting in the payment of much yardage to the miners and in the production of the large proportion of small coal or screenings which narrow places always provide. These conditions are sometimes obviated by making both the headways and the bords 15 ft. wide and allowing the roof to cave except in such passages as are needed for haulage or airways.

The system employing rooms or bords hydraulically sand filled is to be found only in Upper Silesia, where it is used in the flatter coal beds, up to thicknesses of 10 or 12 ft. In the thicker multiple beds (up to 60 ft. in thickness in the Myslowitz colliery) the longwall slicing system is employed, in some instances layer by layer. In steeply pitching beds (as in the Delbrück colliery) successive horizontal slicing followed by sand filling is used. The bord workings are driven like narrow rooms from the level or gangway, forming large rectangular pillars, which are extracted by successive slices from gangway to gangway. As fast as the slices are extracted the spaces are filled hydraulically with sand and gravel by the method introduced from the anthracite district of Pennsylvania in 1897, and developed to meet the particular conditions here encountered. The recovery apparently is quite complete.

This method has succeeded in preventing the spontaneous fires which were a serious menace in mining these thick coal beds by the room or chamber method. The only serious objection is the loss of timber, for few of the props and lagging necessary to support the roof while the coal is being mined are ever recovered. In Upper Silesia extensive sand and gravel beds are found adjacent to or near the mines. Under pre-war conditions the sand filling added only about 25c. per ton to the cost of the coal, which was more than repaid by the freedom from fires and from explosions of coal dust, and by the nearly complete extraction.

To summarize then: (1) Only a small proportion of the coal production in Europe is obtained by mining systems employing pillars (of course, pillars are left around shafts and under buildings, or are maintained as barriers).

(2) Pillar systems are employed to a limited extent in Great Britain and in connection with sand filling in Upper Silesia.

(3) The typical American room-and-pillar system is not employed in Europe except in a few places in Wales.

(4) The pillar system, most generally adopted where

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IN THE NORMASTACHT MINE, SILESIA

Here again are long pole props in large open workings. Note the compressed air drills and the rungs of the ladder with treads of thicker cross-section in the center.

such a method is used at all, is the bord-and-pillar, in which the pillars are extensive, compared with the area taken out by the preliminary bords and headways; in general not over 10 or 15 per cent of the coal is taken out in advance.

(5) In its best form the bord-and-pillar system permits a recovery of 95 per cent of the coal, by what is practically a retreating longwall method.

(6) Pillars are extracted by successive splitting or slicing.

(7) The bord-and-pillar system is applicable only where the coal and roof are relatively strong, the coal free from large partings, and where there is no draw slate that requires gobbing.

(8) The American room-and-pillar system approaches the bord-and-pillar where the rooms are narrow and the pillars wide and the retreat is carried on a diagonal line, as in mines of the Connellsville district of Pennsylvania and in some of the deep mines in the Rocky Mountain region.

Why Some Operators Are Substituting Skips for Cages in the Hoisting of Coal*

Almost Universal Adoption of Skip Hoisting in the Metal-Mining Industry Attests Its Usefulness—For Mines Where Large Coal Must Be Produced, However, Certain Modifications in Design Are Necessary

BY ANDREWS ALLEN AND JOHN A. GARCIA
Chicago, Ill.

LARGE increases in the wages of mine workers make it imperative that all factors tending to limit production per miner be eliminated as far as possible. The trolley and storage-battery locomotive, mining machine, hoisting engine, the system of mining followed, etc., all have increased the possible output per man, but this output is still limited by the capacity of the hoisting engine and cable and by the size of the mine car.

The superiority of skip hoisting in metal-mining operations is shown by its almost universal adoption. By varying the size of the skip and the rope speed, any desired hoisting tonnage can be obtained, and as in metal mines only one kind of material usually is handled and the breakage of ore is unimportant, skips can be easily and cheaply loaded from bins into which the material from the mine cars has been dumped. Accordingly the cars may be designed to fit the conditions existing in the mine rather than as a compromise between what is necessary to satisfy hoisting and mining requirements. Such a compromise is quite likely to suit neither shaft nor mine conditions.

In coal mines the usual practice has been to hoist the car to the surface, either on platform or self-dumping cages. Of late years the number of skip-hoisting plants in coal mines has been rapidly increasing, but more or less inertia must be overcome in establishing so radical a change in practice; furthermore, the earlier skip operations were not uniformly successful. As a result, it became evident that metal-mining practice would require radical modification before skip hoisting could be successfully used in coal mining.

EARLY SKIP HOISTING INCREASED DEGRADATION

Except where coal is used for coking or other purposes where breakage is unimportant, its degradation at all points between the face and the railroad car is of vital consequence. The average selling price is seriously reduced when the percentage of screenings is increased. Where metal-mining practice is followed, the coal is dumped into a deep pit, cut off into a skip load by a measuring hopper or other means, dumped into a deep, narrow rectangular skip, and poured out into a bin at the top. This causes excessive breakage.

It is difficult to make a direct comparison between the breakage of coal in mines operated with self-dumping cages and with skips. The amount of fines is influenced by other considerations than handling, such, for instance, as the character of the coal and the percentage of narrow work being driven at the time the test is made.

The complete records of the percentages of two Illinois mines that were started at about the same time and are producing nearly the same tonnage are available. In one, the Kathleen mine of the Union Colliery Co., the coal is hoisted in 10-ton skips; in the other, the No. 2 mine of the J. K. Dering Coal Co., at Eldorado, it is being hoisted in 3½-ton cars. The record for 1920 up to Oct. 1 for these two mines is given in Tables I and II.

TABLE I. PRODUCT AT J. K. DERING COAL CO'S CAGE-HOISTING MINE, ELDORADO, ILL.

Sizes	Percentages
6-in. lump	9.3
6- x 3-in. egg	20.4
1¼- x 3-in. nut	21.6
1¼-in. screenings	48.7
Total	100.0

When 2-in. screenings are considered, the proper proportion of nut added to the 1¼-in. screenings gives 54 per cent for the same period.

TABLE II. PRODUCT AT UNION COLLIERY CO'S KATHLEEN MINE USING 10-TON SKIPS

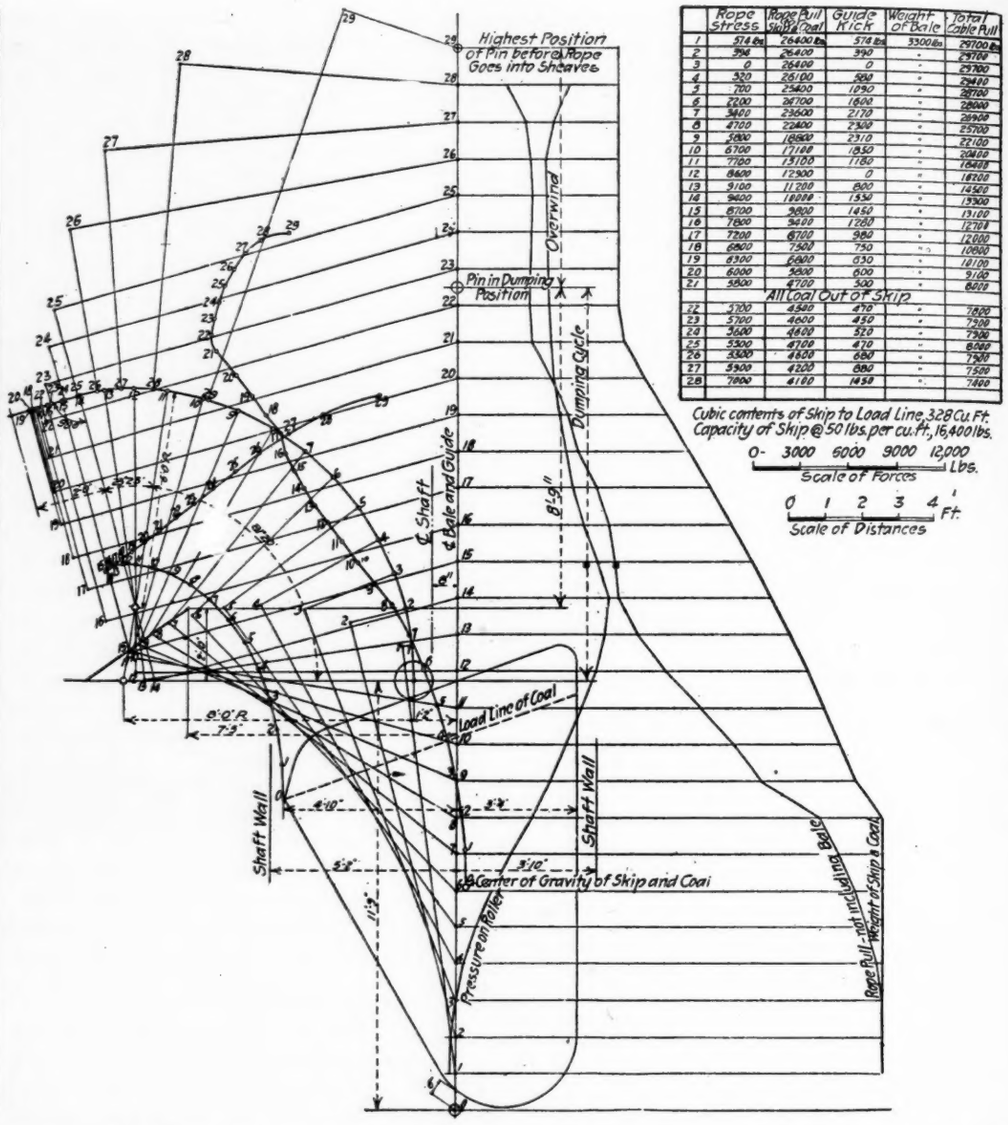
Sizes	Percentages in October	Percentages Jan. 1 to Oct. 31
2-in. lump	2.4	10.4
3-in. lump	0.1	...
6-in. lump	12.7	10.5
3 x 6-in. egg	16.2	14.4
2 x 3-in nut	18.0	13.9
2-in. screenings	50.6	50.8
Total	100.0	100.0

*First part of a paper entitled "Skip Hoisting for Coal Mines" presented before the American Institute of Mining and Metallurgical Engineers, New York, Feb. 16, 1921. The second portion of this paper will appear in a succeeding issue.

FIG. 1

Skip Diagram

The curves on the diagram illustrate for the various increments in the passage of the bale the successive movements of the points on the skip (shown at the bottom of the illustration). Thus the movement of the lip of the bucket and the gravimetric center of the skip and coal are traced in detail as are also the course of the dumping roller. In the upper right-hand corner the calculations of rope stress, rope pull, guide kick, weight of bale and cable pull are recorded. Some of the stresses are plotted graphically to the right of the diagram.


Highest Position of Pin before Rope Goes into Sheaves
Overwind
Pin in Dumping Position
Dumping Cycle
Load Line of Coal
Shaft Wall
Shaft Wall
Center of Gravity of Skip and Coal
Pressure on Roller
Rope Pull - not including Bale
Weight of Skip & Coal
All Coal Out of Skip
Cubic contents of Skip to Load Line, 328 Cu. Ft.
Capacity of Skip @ 50 lbs. per cu. ft., 16,400 lbs.
0- 3000 6000 9000 12,000 Lbs.
Scale of Forces
0 1 2 3 4 Ft.
Scale of Distances

	Rope Stress	Rope Pull Skip & Coal	Guide Kick	Weight of Bale	Total Cable Pull
1	574 lbs.	26400 lbs.	574 lbs.	33006 lbs.	26700 lbs.
2	396	26400	390	"	29700
3	0	26400	0	"	29700
4	520	26100	820	"	29400
5	700	25400	1090	"	28700
6	2200	24700	1600	"	28000
7	3400	23600	2170	"	26900
8	4700	22400	2300	"	25700
9	5800	18600	2310	"	22100
10	6700	17100	1850	"	20400
11	7100	15100	1180	"	18400
12	8600	12900	0	"	16200
13	9100	11200	600	"	14500
14	9400	10000	1550	"	13300
15	8700	9800	1450	"	13100
16	7800	9400	1280	"	12700
17	7200	8700	980	"	12000
18	6800	7500	750	"	10800
19	6300	6800	630	"	10100
20	6000	5600	600	"	9100
21	5900	4700	500	"	8000
		All Coal Out of Skip			
22	5700	4500	470	"	7800
23	5700	4600	450	"	7900
24	5600	4600	520	"	7900
25	5500	4700	470	"	8000
26	5300	4800	680	"	7400
27	5900	4200	890	"	7500
28	7000	4180	1458	"	7400

It will be noted that a lower percentage of 2-in. screenings was made in the skip-hoisting mine than in the mine having cages, which bears out the theory that handling coal in large masses, as in skip hoisting, does not cause any more breakage then does its handling on self-dumping cages.

Skip Plant Costs More But Pays in the End

An installation for dumping cars and loading skips underground costs more than does an ordinary coal-mine bottom, where cars are run directly onto a platform or self-dumping cage. However, keeping the entire cost of the plant in view, it will be found that many important savings may be effected, and the expenditure may be justified by the greatly increased hoisting tonnage and the decreased cost of labor.

As coal dust is inflammable, the dumping of coal at the bottom of a downcast hoisting shaft might be considered a source of danger. This objection, in our opinion, has been greatly overestimated. From a close observation, we think that only an extremely small amount of dust thus produced finds its way into the entries. Effective means are available for allaying such dust, should it become a serious menace. Where the hoisting shaft is an upcast, no trouble from this source can be experienced.

The difficulties arising in inspection and docking perhaps constitute the most serious objection to skip hoisting. Yet these may be easily overcome. In a large mine it is impossible to examine and dock each car separately. The effort of the mine management should be directed to obtaining clean coal at the face, and the only practicable method of checking the work of the loaders is to employ a "spotting system," by means of which a certain number of cars, taken at random or from sections of the mine where careless loading is suspected, are shifted to one side and carefully and thoroughly inspected, the docked cars being identified and the losses charged against the guilty loader.

Three Ways of Handling Rock at Skip Mine

Where the coal is dumped indiscriminately into a deep pit, no docking or spotting system is possible, except through the use of an auxiliary shaft; but where a skip installation is properly designed, it is as easy to dock where a skip is used as it is where the coal is hoisted in a cage. This can be done without any greater inconvenience or sacrifice of output.

Many coal mines are compelled to hoist large quantities of rock. Where cages are employed, the rock can be taken as it comes in the trip and disposed of at

the top by means of a fly gate or some similar contrivance. Where skips are loaded from a pit, rock can be handled only at an auxiliary shaft or at the main shaft during a second shift. In both methods the rock cars have to be cut out of the trips in which they appear. This is readily done if at the partings care has been exercised in assembling the cars.

In a skip mine an excessive hoisting capacity can be provided such as will be sufficient to handle both rock and coal. Where a deep pit is not used, the design can be easily arranged so that a moderate quantity of rock can be hoisted at the main shaft without the slightest difficulty.

A skip will not handle men or material unless equipped with an auxiliary deck, in which case it becomes cumbersome and inconvenient. While this can be done successfully, the interruptions to hoisting arising from the handling of men and material during the day shift are serious in any large mine and practically all modern large-tonnage mines have found it necessary to install an auxiliary hoisting plant in a separate compartment, usually in connection with the airshaft. Such an auxiliary hoist meets this objection completely.

Why Skip Hoisting Is To Be Preferred

The advantages of skip hoisting are as follows: (1) A hoisting capacity capable of handling all the coal and rock that can be mined. (2) A smaller shaft. (3) A large ratio of lading to gross weight. For example, for an 8-ton skip and a 4-ton self-dumping cage this ratio is as in Table III.

TABLE III. WEIGHTS IN POUNDS THAT MUST BE HOISTED WITH SKIP AND CAGE

	Skip Installation	Cage Installation
Weight of cage or skip	13,000	14,000
Weight of car	.....	4,000
Weight of coal	16,000	8,000
Totals	29,000	26,000

With the cage the coal constitutes about 30 per cent of the total weight hoisted, while in the case of the skip the coal represents 55 per cent of that weight.

Other advantages are: (4) A low rope speed, resulting in lower power consumption and a less expensive hoisting plant; greater regularity and safety in hoisting, including freedom from the casualties which hoisting usually entails. These accidents are the result of speed and violence in cage operation. (5) Entire absence of hoists that "miss the hook," or cars that go into the basket. Such mishaps are encountered in self-dumping cage operations, and result in wrecks and delays. (6) Skip hoisting requires not more than one-half the men ordinarily employed in the operation of a smaller self-dumping cage installation. (7) Solid-end cars can be used with a skip hoist, thus making it unnecessary to operate wagons having lifting or hinged end gates. This lowers the first cost of the cars, cuts the maintenance cost in half, and prevents dust and spillage of coal on the roadway.

Type of Skip That Should Be Preferred

Two types of skips are now in use. The first of these is rectangular, of uniform cross-section, and of any required depth. The bottom of the skip slants at a steep angle to the gate, which is placed in one side. This gate is operated by engagements in the tipple and is held tight when running in the shaft, by means of a latch or toggle levers. The best example of this type is known as the Lepley skip. The gate is held in place by toggle levers and, when opened, by engagement with the tipple acts as a chute extending over the dump plate.

	Self Dumping Cage	Overturning Skip	Bottom Dumping Skip
Depth of Shaft	400'	400'	400'
		Pit 24'	Pit 24'
Total Hoist	Tipple 60'	Tipple 46'	Tipple 46'
(Capacity)	Dumping 6" = 466'	Dumping 13" = 469'	Dumping 13" = 485'
	800 Tons per Hr.	800 Tons per Hr.	800 Tons per Hr.
Cycle: Loading on Casing	4 sec.	8 sec.	8 sec.
Hoisting: Accelerating	6 sec.	8 sec.	8 sec.
Running	4 sec.	15 sec.	15 sec.
Retarding	4 sec. 18 sec.	5 sec. 36 sec.	5 sec. 36 sec.
Weight of Cage or Skip	14000 #	13000 #	17000 #
Car	4000 #	—	—
Coal	8000 # = 26000 #	16000 # = 29000 #	16000 # = 33000 #
Size of Hoisting Rope	1⅛"	1⅛"	1⅛"
Hoist during Dump	6'0"	13'0"	2'6"
Net Lift available for Cycle	12000 #	8400 #	17000 #
Average Rope Speed	2000' per minute	1050' per minute	1040 per minute
Max Rope Speed	3610' "	1490' "	1475 "
Size of Cylinders (Conical Drum)	5'11" Diam.	8'11" Diam.	8'11" Diam.
	Direct Connected	Geared	Geared
D.C. Hoist Motor	1000 HP	650 HP	845 HP
(90 Foot Mean Square)			
Size of DC Generator on			
Ilgner Set	1400 KW	600 KW	600 KW
A.C. Motor on			
Ilgner Set	800 HP	600 HP	600 HP
A.C. Input per Hour	636 KWH	585 KWH	582 KWH
Per Ton of Coal	0.82 KWH	0.657 KWH	0.650 KWH
Hoist Overall Efficiency			
Based on Rope Haul	93.0%	53.8%	54.5%
Approx. Cost for Factory (1920 Basis) Duplex	$ 25000 @	$ 30000 @	$ 30000 @
Electrical Equipt.	$ 90000 & $ 16000 @	$ 48000 & $ 13000 @	$ 48000 & $ 12000 @

FIG. 2. COMPARATIVE DATA FOR CAGE SKIP HOISTS

Though the drum for the self-dumping cage is less expensive, the cost of the electrical equipment for the overturning or bottom-dumping skip is in the case selected about half as much as for the self-dumping cage. Note that the size of the direct-current generator on an Ilgner set is more than twice as great with a self-dumping cage as with an overturning or bottom-dumping skip.

In the case of an 8-ton skip the discharge lip must be hoisted about 2 ft. 6 in. above the point at which discharge of coal is commenced before the final position of the skip is reached. At this point the skip may stand stationary while the coal flows out. This should not take more than four or five seconds, during which time the other skip is being filled.

The objections to a skip of this character are: (1) The discharge mechanism must be attached to the skip; this not only increases the weight and cost, but puts the working parts in a position where they are easily damaged but are difficult to repair or lubricate. (2) The hinged gate is a weak point. The coal dumps directly upon it, and, like the operating mechanism, it is subject to serious wear, which in time will cause leakage. (3) The form of the skip makes it necessary to dump the coal from the bin directly into a V-shaped bottom. This produces more breakage than is incurred when using a skip of any other form.

The advantages of this skip are: (1) A slightly shorter movement during the dumping operation. In the Lepley 8-ton skip the loading lip will be about 14 ft. 6 in. above the dump chute when the final discharge position is reached, whereas with the overturning skip of same capacity this distance is about 4 ft. 6 in. greater. (2) Greater capacity in a given size of shaft, compared with the round-bottom type, as the skip may be made as deep as desired. (3) Adaptability to installation of a platform for men or materials. (4) A larger dead weight available for counterweighting the loaded skip when it is lifted from the bottom. The entire weight, 17,000 lb., is available for counterweighting, whereas a round-bottom overturning skip weighing 13,000 lb. will lose about 5,000 lb., leaving only 8,000 lb. available for counterweighting the loaded skip.

The type of overturning skip that has been successfully adapted to coal mining is, in shape, much like an old-fashioned coal scuttle, having a rounded bottom and a discharge side about 30 deg. off the vertical.

This form saves breakage because the coal does not strike a square blow on the steel side or bottom. As the skip is not excessively deep, the slanting discharge side makes it possible to empty the coal completely with a dumping angle of 105 deg. in place of the 135 deg. required by a rectangular skip.

The cycle of dumping operation is shown in Fig. 1. It will be noticed that the discharge of coal commences at point 8 and is completed at point 21, covering a vertical hoisting distance of 13 ft., commencing well below the dumping point and finishing at a position where the loading lip of the skip, if hoisted vertically, would be 19 ft. above the dumping point. While traversing this distance the coal is discharged uniformly and sustains little drop when flowing into the chute.

The skip shown is loaded from the side opposite its discharge; in this way the greatest capacity is obtained. The depth of the skip from loading lip to bottom is fixed by the width of the shaft and the angle of the discharge side. The coal in loading naturally assumes a position approximately as shown by the dotted line on the diagram. The skip is held vertical in the shaft by gravity, being pivoted slightly in front of the center of gravity; also by a spring latch on each side. These are opened by engagements on the tipple and automatically snap into position again when the skip descends.

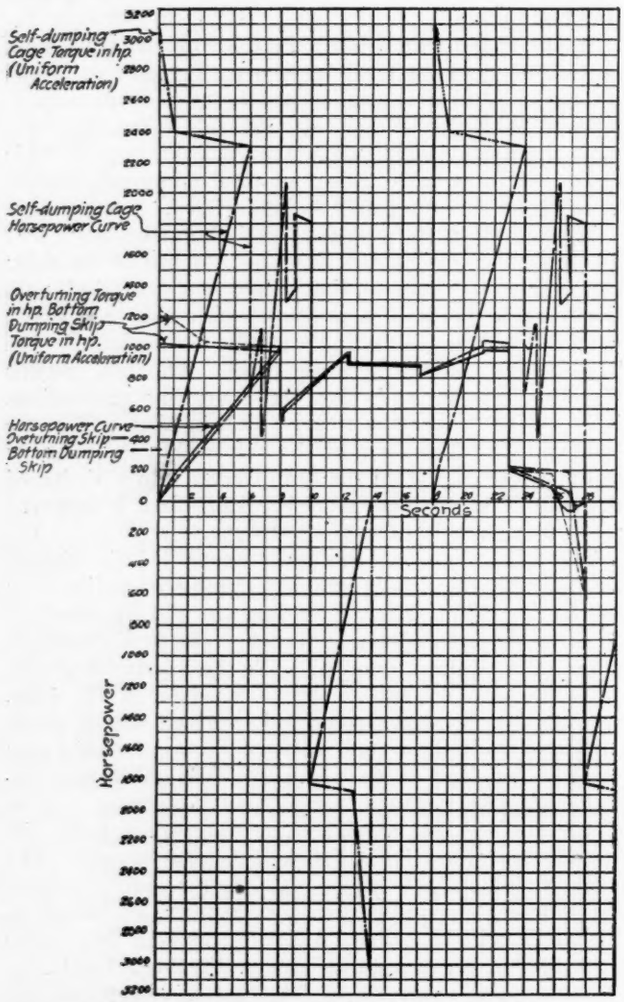

Self-dumping Cage Torque in hp. (Uniform Acceleration)
Self-dumping Cage Horsepower Curve
Overturning Torque in hp. Bottom Dumping Skip Torque in hp. (Uniform Acceleration)
Horsepower Curve Overturning Skip — Bottom Dumping Skip
Seconds
Horsepower

FIG. 3. CURVES OF POWER CONSUMPTION

The peak of the cage-hoisting cycle is about 3,100 hp. whereas the peak of the skip-hoisting cycle is a little more than 1,000 hp. for the bottom-dumping skip and more than over 1,200 hp. for the overturning skip.

The dumping is effected by two well-lubricated wheels of comparatively large diameter at the top of the skip engaging long angle-iron guides carefully formed to the exact dumping curve. The skip is held rigidly between the bales by tapered plates, which bring it into a true vertical position as it returns into the shaft. It is possible to omit the latches and to place a second set of guides in the shaft, so that the dumping wheels will come in contact with them if the skip should become unbalanced. Both of these types are in successful operation.

The objections to this skip, compared with the bottom-dumping type, are: (1) A slight sacrifice of capacity, meaning a slightly larger shaft for the same output. (2) A slightly greater hoist to accommodate the dumping cycle at the top. This amounts to about 4 ft. 6 in. for an 8-ton skip. (3) Less load on the hoisting rope available for counterweighting the loaded skip when the cycle has been completed.

Advantages inherent in this type of skip are: (1) Simplicity and ruggedness; (2) lightness in proportion to the load; (3) less breakage; (4) an easy and uniform discharge without the possibility of large pieces of rock or coal lodging in the gate and with no more drop than is experienced with the bottom-dumping skip.

Skips Hold from Five to Fifty Tons

A skip can be made to handle almost any desired capacity; those now in use ordinarily hold a maximum of from five to thirteen tons for balanced hoisting. A 50-ton skip is being designed for counterweighted operation. Any skip should be so planned as to hold some multiple of the mine-car capacity. This provision being made, the cars can be dumped directly into the skip, eliminating the deep pit and the measuring hopper. The time required to load one of these skips will average from five to eight seconds measured from the moment when the skip lands on the timbers to the time when it is belled away. With balanced hoisting, an average load of nine tons, a total hoist of 400 ft. and an average rope speed of 1,000 ft. per min., it is possible to hoist and dump slightly over 1,000 tons per hour.

Figs. 2 and 3 furnish a comparison between the power consumption, motor sizes and cost of hoist for three assumed installations designed for the same capacity. The first is a self-dumping cage installation; the second uses overturning skips, and the third is an installation of the Lepley type. The comparisons are made on the basis of a 400-ft. shaft and a hoisting capacity of 800 tons per hour.

Skips Show Advantage in Deep Shafts

This, of course, is somewhat high for cage hoisting, although it is within the limits of actual practice. If the comparison had been made on the basis of 1,000 tons per hour or for a deeper shaft, the skip installation would show only a moderate increase in power consumption, whereas the power used by the cage installation would increase at such a rapid ratio that it would soon exceed the practicable limits of construction and operation.

Comparisons could not be made for three existing mines of these types, as it would be impossible to get exactly parallel conditions. The figures used, however, are based on actual results and are worked out on exactly the same basis.

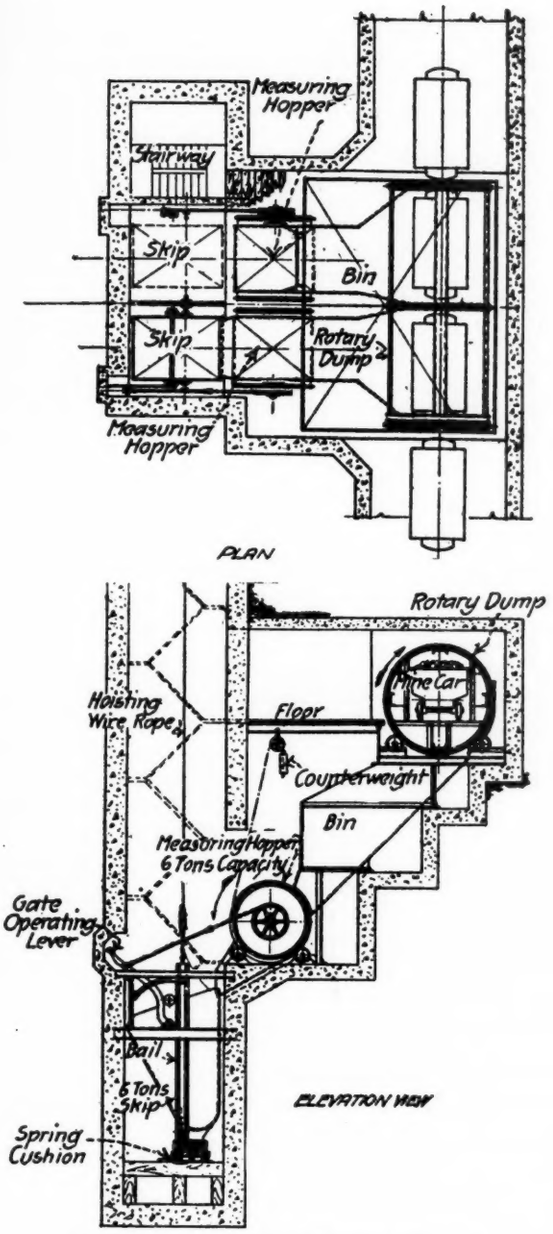


FIG. 4. PIT AND MEASURING HOPPER

This arrangement is admirably suited for such mines as are indifferent as to size of product. Where the coal is to be used for coking such an arrangement will work well.

Furthermore, the comparison is made on the basis of direct-current hoisting with an Ilgner flywheel set, so proportioned as to take the peak load off the line, thus giving a uniform power consumption for the cycle assumed. If the peak load is not too great for the transmission line, an alternating-current hoist may be used, which will show a large economy in first cost. It will be noted that the peak of the cage-hoisting cycle is about 3,100 hp. (2,311.7 kw.), while the peak of the skip-hoisting cycle is a little over 1,000 hp. (745.7 kw.) for the bottom-dumping skip and a little over 1,200 hp. (894.8 kw.) for the overturning skip. The motor sizes are approximately 2,000 hp. (1,491.4 kw.) in the case of the cage and 850 hp. (633.8 kw.) in both skip installations. Neither of these, under ordinary circumstances, would permit the use of an alternating-current hoist, but such a hoist can be used to a much larger capacity with a skip than with a cage.

Where steam hoists are used there is no such difference in favor of the skip, as the size of the hoisting engine is determined by the total load rather than by the acceleration peak. The steam consumption will, however, follow approximately the power curves shown. The diagrams and tables show that either skip installation possesses a power economy of nearly 25 per cent compared with the cage; also there is a difference in cost of approximately $37,000 in the examples cited.

Where no attention is paid to breakage and where inspection of coal and rock are provided for elsewhere, there are some advantages in the bottom layout in which the cars are dumped directly into a deep pit, which can be used to store a large amount of coal. From the pit the coal flows into an automatic measuring hopper, and then to the skip by means of a gate operated by the skip itself. This arrangement is shown in Fig. 4.

This method has two advantages: The skips can be loaded to full capacity, irrespective of the size and loading of the cars, and dumping operations can be carried on without reference to the hoisting cycle, thus reducing the number of cars used in the mine. A few more pit cars, however, will provide greater storage at less cost. In an outfit of this kind it may be possible to obtain the desired dumping capacity with a single-car instead of a two-car rotary dump, the latter being necessary where the dumping is regulated by the skip, though at the cost of breakage, and inability to dock and to handle rock.

Two Hundred Hoists Per Hour at Gillespie

MINE No. 3 of the Superior Coal Co., at Gillespie, Ill., on Dec. 4 last broke all previous records for Macoupin County and established a new high score for cars hoisted in eight hours. The total output for the day was 5,730 tons, the hourly hoist tally being as follows: First hour, 199; second hour, 184; third hour, 202; fourth hour, 203; fifth hour, 204; sixth hour, 204; seventh hour, 206, and eighth hour, 201; total, 1,603 hoists. The coal raised filled 135 railroad cars.

During the entire day no time was lost on top. One car was derailed on the bottom, causing a delay of two minutes. The hoist engine at this plant is a 24 x 36 in. Litchfield machine equipped with conical drums increasing from 6 ft. to 8 ft. in diameter. This hoist is in charge of George Klein and Fred Hoppe, who change off every hour.

This mine, which is equipped with electric cutting machines, hauling being done by nineteen locomotives and five mules, is in charge of Alex. Young, mine manager. The output of Dec. 4 was loaded by 375 miners handling an average of 15 tons per man.

(*Coal Age* wishes to congratulate the men and officials of Superior No. 3 mine on their accomplishment. Who can beat it?—EDITOR.)

Graduate Assistantships Offer Opportunity For Research and Study With Pay

TO ASSIST in the conduct of engineering research and to extend its graduate work in engineering, the University of Illinois maintains fourteen research graduate assistantships in the Engineering Experiment Station. Two other such assistantships have been established under the patronage of the Illinois Gas Association. These assistantships, for each of which there is an annual stipend of $600 and freedom from all fees except the matriculation and

diploma fees, are open to graduates of approved American and foreign universities and technical schools.

An appointment to the position of research graduate assistant is made and must be accepted for two consecutive collegiate years, at the expiration of which period, if all requirements have been met, the degree of Master of Science will be conferred.

There are now twelve vacancies in these fellowships, and the mining department expects that at least one and possibly two will be allotted to it, if suitable candidates make application. The mining department has a thoroughly equipped laboratory for coal washing, ore dressing, hydro metallurgy, the study of mine gases and coal dust, rock drilling and coal cutting, explosives, and, of course, has access to the other laboratories of the university and particularly to those of the Engineering Experiment Station.

Special attention is directed to the advantages offered in industrial chemistry in connection with coal and coke work under Prof. S. W. Parr. Special graduate courses in the Economics of Mining also are available. The resident engineers and chemists of the U. S. Bureau of Mines are carrying on at this station researches of great interest to graduate students in mining.

Additional information may be obtained by addressing the director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

Kinds of Coal That Go Into Tidewater Pools

Striking Contrast in Fixed Carbon and Volatile Matter Shown Between Coals of Pools 1, 2, 42 and 4 and Those of Pool 21 and Higher Numbers — Careful Preparation and Systematic Inspection Exert Important Influence on Classification

By Dr. Henry M. Payne

NO ATTEMPT has ever been made officially to specify by analysis the quality of the coal included in the various classified pools. Pool 1, American Standard Navy Coal, is limited to those mines on what is known as the navy acceptable list and pool 71 includes only those mines in the Northern fields on the navy supplemental list. These pools, therefore, have an official recognition not accorded to any other, but this guarantee of quality comes from the navy and not the Tidewater Exchange. The first classification was made in the summer of 1917 by a group of men thoroughly familiar with the coals shipped to the Atlantic ports and the mines producing these coals. Although the work was done under pressure and it was not possible to take time for collection of extensive data or for examination of samples where knowledge was lacking, the original grouping of the mines was exceedingly well done and subsequent refinements have not added greatly to the perfection of the pools. Those who have made the classifications from time to time doubtless have had in mind the limits as of ash, sulphur, and volatile content as well as heating value that are to be included in each classified pool, but these limits have never been made a matter of official record or published.

The analyses and fusing points of ash published in this paper are averages of a large number of shipments I have collected over a period of years. They are believed to be representative of the coals shipped through these pools, but they are not and cannot be guaranteed, nor are these analyses officially authorized by the Tidewater Coal Exchange, Inc. Being averages they do not show the upper and lower limits of quality in each pool. It should be understood that no single shipment of coal in any pool will show an analysis exactly comparable to the average given.

To assist in visualizing the range in quality and in certain chemical properties of the coals comprising the several "mine-run" pools the average analyses in the accompanying table are shown graphically in the accompanying diagrams. In these diagrams the coals in the Northern fields are separated from those in the Southern fields and the four elements in the proximate analysis—fixed carbon, volatile matter, ash and moisture—are plotted as segments of vertical columns, arranged from left to right in descending order of percentage of fixed carbon. Above this part of the diagram is plotted the heat value in British thermal units, and on a separate diagram are shown the sulphur content and the fusing point of the ash in degrees centigrade. This arrangement, of course, puts the low-volatile pools on the left of each diagram and the high-volatile pools on the right. A striking feature brought out in this manner is the sudden change in fixed carbon and volatile matter content from the low-volatile coals (pools 1, 2, 42 and 4) in the Southern fields to the high-volatile coals, as contrasted with the uniform graduation from the low-volatile coals (pools 1, 71, 8, 9, 10 and 11) in the Northern fields, through the medium-volatiles (pools 12, 14 and 15) to the high-volatiles (pools 21 and those with higher numbers).

Distribution of Low- and High-Volatile Coals

Comparing these average analyses of the coals entering into each major pool with the geographic distribution of the mines producing the various coals, as shown in the maps in the preceding issue of *Coal Age* (March 10, 1921, pp. 442-445), it will be noted that the southern areas of low- and high-volatile coal are well defined. In Pennsylvania, Maryland and northern West Virginia it may be said in general that the low-volatile coals lie on the eastern side of the measures, and the high-volatile coals to the west, while the medium-volatile mines are found to overlap portions of both. In a few instances both low- and high-volatile seams are found adjacent.

Certain localities by virtue of concentrated development, exceptional railroad facilities, or recognized geological features, have acquired sufficient distinction to warrant individual pools, as the Greensburg Basin (pool 40), Marion County gas (pool 38), etc.

The principal seam mined for gas coal is the world-famous Pittsburgh, which blankets southwestern Pennsylvania and northern West Virginia. This seam is sold under various trade names, the principal of which are Pittsburgh, Westmoreland, Youghiogheny, Pittsburgh-Fairmont, and Marion County gas coal.

It has been my observation that from north to south,

the fusing point of ash decreases from about 2,600 deg. F. to 2,100 deg. F. in this seam, while the sulphur and ash contents show a slight increase. The friability of the seam varies greatly, in certain localities the output being extremely hard and blocky, standing transshipment well, while in others it is sufficiently soft to market principally as a mine-run.

Of particular significance are data on production of coal in each pool classification. It must be evident that the capacity of mines producing coals of the higher grades is limited, otherwise there would be no production of the lower-grade coals. Statistics giving complete details of this character are not available, but the following table, prepared by the Central Pennsylvania Coal Producers' Association, gives a good idea of the relative output of the mines comprising the several classified groups in this important field:

PRODUCTION OF COMMERCIAL COAL BY CLASSIFIED POOLS IN CENTRAL PENNSYLVANIA IN 1918

Pool	Net Tons	Pool	Net Tons
1, 9, 71	9,446,790	15	1,955,432
4	2,137,160	18	4,240,877
10	12,312,834	21	502,964
11	5,794,397	Unclassified	4,204,888
12 to 14	7,668,801		
14	6,810,896	Total	55,075,039

In determining the classification of mine marked attention also is paid to facilities for preparation of coal and the degree to which they are utilized, because as between two coals of similar grade in a competitive market the one may be rendered worthy of a somewhat higher classification by virtue of regular and thorough picking or screening and by more systematic inspection or, as is not infrequently the case, by attention to roof rock or top coal or partings in mining. The coal from mines on the same bed in the same field, therefore, may not all be classified in the same pool, but because of the more or less uniform character of each well-recognized coal bed it follows that, at least locally, the output of coal from a given bed is of particular significance. There are given herewith certain statistics of production of coal by coal beds in 1918 as published recently by the U. S. Geological Survey. These figures represent the nearest approach at present possible to a record of the production of coal according to quality—that is, according to the pools.

An idea of the relative productive capacity of the several pools shown graphically on the maps in the preceding issue of *Coal Age* is obtained from the following table showing the number of mines included in

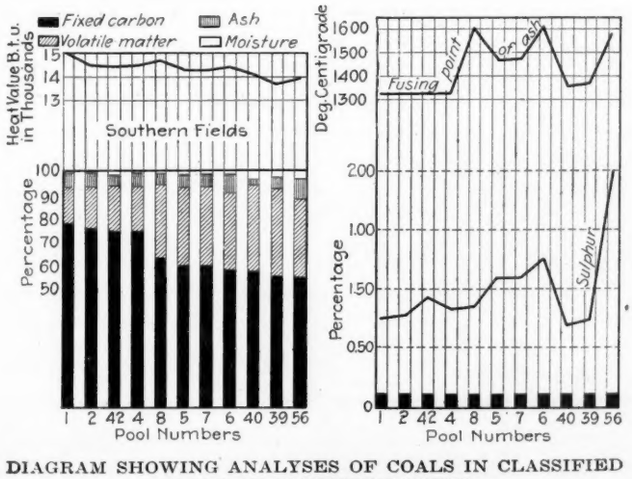


DIAGRAM SHOWING ANALYSES OF COALS IN CLASSIFIED POOLS AT SOUTHERN PORTS

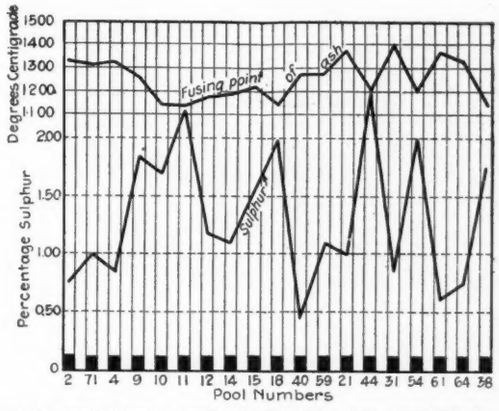

Degrees Centigrade
Fusing point of ash
Percentage Sulphur
Sulphur
Pool Numbers
2 71 4 9 10 11 12 14 15 18 40 59 21 44 31 54 61 64 38

DIAGRAM SHOWING PERCENTAGES OF SULPHUR AND FUSING POINTS OF ASH IN COALS IN CLASSIFIED POOLS IN THE NORTHERN FIELDS

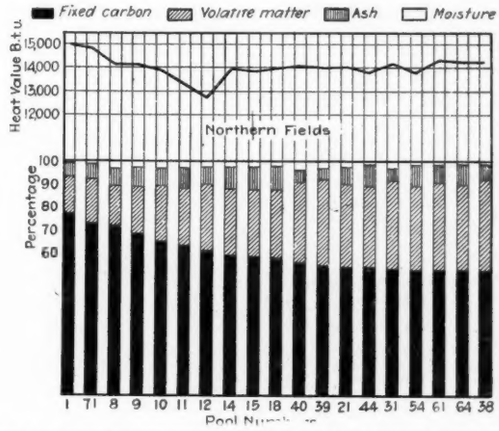


DIAGRAM SHOWING PROXIMATE ANALYSES AND HEAT VALUE OF COALS IN CLASSIFIED POOLS IN THE NORTHERN FIELDS

the original and amended classification. Each of these 3,680 mines was located on the maps from which were drawn those published.

NUMBER OF MINES, CLASSIFIED BY POOLS AND REGIONS

I. Southern Fields

	Pools 1 and 2	Pools 5, 6, and 7	All Other Pools
Virginian	166	32	37
Chesapeake & Ohio	111	426	40
Nashville & Western	154	202	20
	431	660	97

II. Baltimore & Ohio and Tributary Roads

Pools	1–71	9–10–11	34	38	30–60	All other
No. of mines	5	238	279	41	128	377

III. Pennsylvania Railroad and Tributary Roads

Pools	1–71	9–10–11	12–14–15	34	40	30–60	All other
No. of mines	32	423	90	145	30	110	239

IV. New York Central and Tributary Roads

Pools	1–71	9–10–11	12–14–15	All other
No. of mines	2	186	89	68

Total group I	1,198
Total group II	1,068
Total group III	1,069
Total group IV	345
	3,680

The third and last installment of this discussion of the Tidewater pools will describe the mechanics of the exchanges and will be accompanied by a map showing the freight rates from each rate group to Tidewater.

In response to a number of requests COAL AGE will publish the three articles by H. M. Payne on the tidewater coal pools as a reprint after the third and last number has appeared in the issue of March 24. Maps appearing in COAL AGE of March 10 will be republished on the same scale in order that they may be fitted together. Several corrections of minor importance with respect to locations of towns and railroads will be made on the republished maps.

Tidewater Exchanges	Pool	Designation of Classification	Size	Seams from Which Mined	Railroads	Approximate Average Analyses: Moisture	Volatile	Fix. Car.	Ash	Sulphur	Fusing Point of Ash: Deg. Fahr.	Deg. Cent.	B.T.U.	Calories
NPB HR	1	*AMER. STANDARD LOW VOLATILE* (Mines on Navy Acceptable List)	R. M.	Pocahontas No. 3 Pocahontas No. 4 Sewell Beckley Fire Creek "B" or Miller Fulton	C. & O. K. & M. N. & W. Vir. C. C. & O. L. & N. C. & P. P. R.R.	0.62	16.28	77.40	5.70	0.75	2,425	1,328	15,000	8,333
HR	2	OTHER HIGH GRADE LOW VOLATILE (Pocahontas, Flat Top, New River, Tug River and Virginian Ry. Points)	R. M.	Pocahontas No. 3 Pocahontas No. 4 Sewell Fire Creek	C. & O. N. & W. VIR.	0.39	17.60	75.79	5.72	0.78	2,425	1,328	14,500	8,055
HR	3	LOW VOLATILE		Pocahontas No. 3 Pocahontas No. 4 Slack Sewell Beckley Fire Creek	C. & O. K. & M. N. & W. C. C. & O. L. & N. VIR.	1.00	16.50	76.50	6.00	0.75	2,425	1,328	14,500	8,055
NPB	4	*GOOD "B" and "D" SEAM*	R. M.	Lower Kittanning "B" or Miller.	N. Y. C C. & I.	3.00	16.50	72.50	8.00	1.75	2,490	1,364	14,100	7,833
HR	4	MEDIUM GRADE LOW VOLATILE	R. M.	Pocahontas No. 3	VIR.	0.66	18.81	74.78	5.75	0.84	2,425	1,328	14,500	8,055
HR	5	HIGH VOLATILE GAS	R. M.	No. 2 Gas Freeburn Upper War Eagle, etc.	N. & W. C. & O.	1.50	33.30	60.00	5.20	1.10	2,680	1,470	14,280	7,933
HR		HIGH VOLATILE STEAM	R. M.	Upper Banner Lower Banner Kennedy Imboden No. 5 Block Thacker Winifrede Coalburg Elkhorn	N. & W. C. & O. C.C.& O.	1.50	33.00	58.00	7.50	1.25	2,950	1,619	14,400	8,000
HR	7	HIGH VOLATILE BY-PRODUCT	R. M.	No. 2 Gas Freeburn Upper War Eagle, etc.	N. & W. C. & O.	1.50	33.30	60.00	5.20	1.10	2,680	1,470	14,280	7,933
HR	8	HIGH VOLATILE BY-PRODUCT (Virginian Ry. Points)	R. M.	Eagle No. 1 Gas Middle War Eagle	VIR.	0.81	31.01	63.09	5.09	0.86	2,940	1,614	14,710	8,133
NPB	9	*UNDER 24 PER CENT VOLATILE* (Classification "C": Somerset C Prime "D": High Grade South Fork, Miller Vein, E.B.T.R.R.& C.Co.)	R. M.	Upper Kittanning "C" Prime Lower Kittanning "B" or Miller	W. M. B. & O. C. & P. P. R.R. E.B.T.	2.88	20.03	69.12	7.97	1.85	2,300	1,259	14,100	7,833
NPB	10	*UNDER 24 PER CENT VOLATILE* (Classification "C": Superior Low Volatile "D": Superior Steam Low Volatile "E": "C" and "D" Seams)	R. M.	Upper Freeport "E" Upper Freeport "D" Middle Kittanning "C" Kittanning "B" Clarion	P. R.R. B. & O. N. Y. C. P. & S. W. M.	3.10	23.48	65.84	7.58	1.69	2,100	1,148	13,850	7,693
NPB	11	*UNDER 24 PER CENT VOLATILE* (Fair Low Volatile)	R. M.	Upper Freeport "E" Upper Freeport "D" Middle Kittanning "C" Kittanning "B" Clarion	P. R.R. B. & O. N. Y. C. P. & S. W. M.	3.10	24.00	63.90	9.00	2.25	2,090	1,142	13,350	7,416
NPB	12	*BETWEEN 24 PER CENT and 31 PER CENT VOLATILE* (High Grade Medium Volatile)	R.M.	Upper Freeport "E" Lower Freeport "D" Pittsburgh	P.R.R. B. & O. N. Y. C. C.& I. B. R. & P.	2.53	28.07	62.10	7.30	1.18	2,150	1,175	12,710	7,061
NPB	14	*BETWEEN 24 PER CENT and 31 PER CENT VOLATILE* (Medium Grade Medium Volatile)	R. M.	"B" or Miller Middle Kittanning "C" Lower Freeport "D" Upper Freeport "E" Pittsburgh	P. R.R. B. & O. B. R. & P. P. & S. P. S. & N.	2.47	28.00	60.03	9.50	1.00	2,170	1,187	13,930	7,739
NPB	15	*BETWEEN 24 PER CENT and 31 PER CENT VOLATILE* (And Railroad Fuel Coal)	R. M.	Upper Freeport "E" Lower Freeport "D" Kittanning "B" Pittsburgh	P. R.R. B. & O. N. Y. C.	2.63	28.00	59.37	10.00	1.44	2,235	1,223	13,875	7,708
NPB	18	FAIR LOW VOLATILE STEAM (Classification "C": Ordinary Low Volatile "D" & "E": Ordinary Low Volatile "D" & "E": Steam and R.R.Fuel)	R. M.	Miscellaneous	P. R.R. B. & O. W. M. N.Y.C. C.&P. P. & S.	2.00	29.00	59.00	10.00	2.00	2,100	1,148	14,000	7,777
NPB	20	*LOW VOLATILE* (Classification "C": From Pools 1-9-10-11 "E": Slack)	Slack	Pools 9-10-11 on P.R.R. Pools 1-4-10-71 on N.Y.C. and Connections	P. R.R. N. Y. C.	2.75	22.25	67.50	7.50	1.25	2,390	1,309	14,000	7,777
NPB	21	*HIGH VOLATILE BY-PRODUCT*	R. M.	Pittsburgh	P. R.R.	2.50	35.00	55.00	7.50	1.00	2,515	1,378	14,000	7,777
NPB	30	*GAS COAL.* (Maximum Sulphur 1¼%)	¾ in.	Pittsburgh	P. R.R. B. & O.	1.56	35.51	57.27	5.66	0.90	2,500	1,370	14,355	7,971
NPB	31	*GAS COAL* (Classification "C": Youghiogheny Gas, Low Sul. "D": Gas Coal, Max. Sul. 1¼%)	R. M.	Pittsburgh	P. R.R. B. & O.	2.30	37.00	54.90	5.80	0.85	2,585	1,417	14,180	7,877
NPB HR	32	*GAS COAL* (Classification "B": High Volatile Gas "C": Youghiogheny Gas, Low Sul. "D": Gas Coal, Max. Sul. 1¼%)	Slack	Pittsburgh No. 2 Gas	P. R.R. B. & O. N. & W. C. & O.	2.15	37.40	54.95	5.40	1.05	2,425	1,328	13,925	7,736
NPB	33	*GAS COAL* (Classification "C": Pittsburgh-Fairmont High Volatile Steam "D": High Volatile Steam)	¾ in.	Pittsburgh	P. R.R. B. & O.	1.47	36.77	54.64	7.12	2.00	2,324	1,272	14,250	7,917
NPB	34a	*GAS and STEAM COAL* (Classification "C": Pittsburgh-Fairmont High Volatile Steam "D": High Volatile Steam)	R. M.	Pittsburgh Redstone Sewickley	P. R.R. B. & O.	1.50	36.10	54.00	8.40	2.25	2,200	1,203	14,000	7,777
NPB HR	35	*STEAM COAL* (Classification "B": High Volatile Steam "C": Pittsburgh-Fairmont High Volatile Steam "D" High Volatile Steam)	Slack	Pools 6-34-54-64	N. & W. C. & O. C. C. & O. B. & O. P. R.R.	1.50	34.55	56.00	7.95	1.75	2,575	1,411	14,000	7,777

Tidewater Exchanges	Pool	Designation of Classification	Size	Seams from Which Mined	Railroads	Approximate Average Analyses: Moisture	Volatile	Fix. Car.	Ash	Sulphur	Fusing Point of Ash: Deg. Fahr.	Deg. Cent.	B. T. U.	Calories
NPB	37	*MARION COUNTY GAS*	¾-in.	Pittsburgh	B. & O.	1.12	40.00	53.26	5.56	1.70	2,100	1,148	14,300	7,944
NPB	38	*MARION COUNTY GAS*	R. M.	Pittsburgh	B. & O.	1.12	39.00	53.40	6.48	1.75	2,100	1,148	14,300	7,944
HR	39	HIGH VOLATILE BY-PRODUCT (Classification "B": Big Sandy Div. C. & O.)	R. M.	Elkhorn	C. & O.	3.40	36.75	55.85	4.00	0.75	2,505	1,373	14,000	7,777
NPB	39	*HIGH VOLATILE BY-PRODUCT* (Classification "D": Greensburg Basin)	¾-in.	Pittsburgh	P. R.R.	2.80	31.00	58.00	8.00	1.10	2,324	1,272	13,700	7,611
HR	40	HIGH VOLATILE STEAM (Classification "B": Local Mines)	R. M.	Darby Taggart	N. & W. C. C. & O.	3.60	36.50	57.50	2.40	0.70	2,480	1,359	14,600	8,011
NPB	40	*HIGH VOLATILE STEAM* (Classification "D": Greensburg Basin)	R. M.	Pittsburgh	P. R.R.	3.65	34.63	56.50	5.22	0.46	2,324	1,272	14,140	7,855
HR	41	HIGH VOLATILE STEAM OR SPLINT	Lump	Same as Pool 6	N. & W. C. & O.	3.25	34.00	56.25	6.50	0.92	2,950	1,619	14,400	8,000
HR	42	LOW VOLATILE GAS	R. M.	Same as Pool 2	N. & W. C. & O.	2.64	19.02	74.89	4.92	0.93	2,425	1,328	14,480	8,044
HR	43	HIGH VOLATILE GAS	Lump	No. 2 Gas	N. & W. C. & O.	1.95	33.00	59.85	5.20	1.30	2,680	1,470	14,280	7,933
NPB	43	*HIGH VOLATILE GAS*	¾-in.	Kittanning Freeport Sewickley Waynesburg Pittsburgh	B. & O. P. R.R.	1.50	34.50	55.00	9.00	2.40	2,220	1,214	13,800	7,666
HR	44	LOW VOLATILE STEAM	Lump	Same as Pool 2	N. & W. C. & O. VIR.	1.37	17.00	77.00	4.63	0.75	2,425	1,328	14,400	8,000
NPB	44	*HIGH VOLATILE GAS*	R. M.	Kittanning Freeport Sewickley Waynesburg Pittsburgh	B. & O P. R.R.	1.50	34.25	55.00	9.25	2.40	2,220	1,214	13,800	7,666
NPB	45	*HIGH VOLATILE GAS*	Slack	Pittsburgh-Fairmont Kittanning Sewickley Waynesburg Pittsburgh	B. & O.	1.50	34.25	55.00	9.25	2.40	2,190	1,198	13,800	7,666
HR	51	HIGH VOLATILE STEAM	1½- 3-in.	Same as Pool 6	N. & W. C. & O. C. C. & O.	2.64	35.42	56.34	5.60	1.00	2,950	1,619	14,550	8,083
NPB	53	*HIGH VOLATILE GAS and STEAM*	¾-in.	Best prepared Kittanning, Freeport, Sewickley, Connellsville Coking.	P. R.R. B. & O.	1.50	35.25	54.25	9.00	2.00	2,200	1,203	13,800	7,666
HR	53	HIGH VOLATILE GAS	1 - 3-in.	Same as Pool 5	N. & W. C. & O.	1.50	33.30	60.00	5.20	1.10	2,680	1,470	14,280	7,933
NPB	54	*HIGH VOLATILE GAS and STEAM*	R. M.	Best PreparedKittanning, Freeport,Sewickley, Connellsville Coking..	P.R.R. B. & O.	1.50	35.00	54.25	9.25	2.00	2,200	1,203	13,800	7,666
HR	54	SUPERIOR LOW VOLATILE	1½- 3-in.	Same as Pools 1-2	C. & O. N. & W. VIR.	0.81	16.64	76.85	5.70	0.75	2,425	1,328	14,750	8,194
HR	56	HIGH VOLATILE STEAM	R. M.	No. 5 Block Winifrede Coalburg Elkhorn	C. & O.	3.09	33.20	55.11	8.60	2.00	2,880	1,581	13,980	7,767
NPB	60	*LOW SULPHUR GAS* (Westmoreland-Youghiogheny Dist.)	¾-in.	Pittsburgh	B. & O. P. R.R. W. M. C. & P.	1.60	36.80	54.25	7.35	0.87	2,500	1,370	14,350	7,972
NPB	61	*LOW SULPHUR GAS* (Westmoreland-Youghiogheny Dist.)	R. M.	Pittsburgh	B. & O. P. R.R. W. M. C. & P.	1.60	36.80	54.25	7.35	0.87	2,500	1,370	14,350	7,972
HR	61	HIGH VOLATILE STEAM	¾- 1 -in.	Same as Pool 6	N. & W. C. & O.	2.60	36.00	54.90	6.50	1.00	2,950	1,619	14,550	8,083
NPB	62	*LOW SULPHUR GAS* (Westmoreland-Youghiogheny Dist.)	Slack	Pittsburgh	B. & O. P. R.R. W. M. C. & P.	1.60	35.80	54.25	8.35	0.90	2,500	1,370	14,350	7,972
HR	63	HIGH VOLATILE GAS	¾- 1 -in.	Same as Pool 5	N. & W. C. & O.	1.50	33.30	60.00	5.20	1.10	2,680	1,470	14,280	7,933
NPB	63	*HIGH GRADE LOW VOLATILE*	¾-in.	Same as Pools 1-2	C. & O. N. & W. VIR.	0.81	16.64	54.00	7.25	1.50	2,425	1,328	14,750	7,933
HR	64	HIGH GRADE LOW VOLATILE	¾-1½-in.	Same as Pools 1-2	C. & O. N. & W. VIR.	0.81	16.64	76.85	5.70	0.75	2,425	1,328	14,750	8,194
NPB	64	*HIGH GRADE HIGH VOLATILE GAS and STEAM* (Maximum Sulphur 2%)	R. M.	Pittsburgh Redstone (Hard structure, gas producing)	P. R.R. B. & O.	1.50	37.00	54.00	7.50	1.62	2,500	1,370	14,280	7,933
NPB	71	*SUPERIOR LOW VOLATILE* (Mines on Navy Supplementary List)	R. M.	"B" or Miller "C" Prime Lower Kittanning	B. & O. C. & I. P. R.R.	1.55	18.54	73.62	6.19	1.00	2,400	1,314	14,800	8,222
HR	84	LOW VOLATILE STEAM	Pea ¼- ¾-in. Nut & Slack	Pocahontas No. 3 Pocahontas No. 4 Sewell Beckley Fire Creek "B" or Miller Fulton	C. & O. K. & M. N. & W. VIR. C. C. & O. L. & N.	0.90	16.00	75.10	8.00	1.00	2,400	1,314	14,950	8,300

NPB = New York, Philadelphia & Baltimore Exchanges.
HR = Newport News, Sewall's Point and Lambert's Point Exchanges at Hampton Roads.
NN = Newport News.
SP = Sewall's Point.
LP = Lambert's Point.
CB = Curtis Bay.
LO = Locust Point.

GP = Greenwich Piers.
PR = Port Richmond.
CN = Canton Piers.
NY = New York Harbor Piers.
BRP = Buffalo, Rochester & Pittsburgh R.R.
P.S.N. = Pittsburgh, Shawmut & Northern R.R.
C. & I. = Cambria & Indiana R.R.
C. & P. = Cumberland & Pennsylvania R.R.
P. & S. = Pittsburgh & Susquehanna R.R.
K. & M. = Kanawha & Michigan R.R.

W. M. = Western Maryland R.R.
E. B. T. = East Broad Top R.R.
C. & O. = Chesapeake & Ohio R.R.
N. & W. = Norfolk & Western R.R.
C. C. & O = Carolina, Clinchfield & Ohio R.R.
L. & N. = Louisville & Nashville R.R.
P. R.R. = Pennsylvania R.R.
Vir. = Virginian Ry.
N. Y. C. = New York Central R.R.
B. & O. = Baltimore & Ohio R.R.

PRODUCTION OF COAL IN 1918 BY BEDS, AS REPORTED BY THE U. S. GEOLOGICAL SURVEY

MARYLAND

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Bakerstown	5	192,947	4.29
Bakerstown and Freeport	1	59,666	1.33
Bakerstown and Pitt. burgh	2	46,251	1.03
Big Vein	5	36,375	0.81
Big Vein and Bakerstown	2	203,294	4.52
Big Vein and Tyson	3	214,699	4.77
Bluebaugh	1	49,679	1.10
Clarion	1	15,159	0.34
Freeport	1	11,965	0.27
Georges Creek Big Vein	1	34,464	0.77
Kittanning	6	265,360	5.90
Kittanning and Freeport	2	129,099	2.87
Lower Kittanning	7	485,952	10.81
Parker	1	39,838	0.89
Pittsburgh	17	1,144,528	25.45
Pittsburgh, Big Vein	3	295,351	6.57
Pittsburgh, Tyson	2	99,043	2.20
Pittsburgh, Tyson, and Bakerstown	1	101,529	2.26
Red Stone	1	5,550	0.12
Split Six	1	12,560	0.28
Tyson	3	94,280	2.08
Tyson, Waynesburg	1	163,940	3.65
Upper Freeport	4	92,329	2.05
Upper and Lower Kittanning	3	132,703	2.95
Upper Kittanning and Bakerstown	1	26,835	0.60
Upper Sewickley	4	231,327	5.14
Not specified	52	312,574	6.95
	131	4,497,297	.....

PENNSYLVANIA

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Barnett	14	253,294	0.14
Barnett and Kelly	2	99,537	0.06
Bear Creek	3	14,632	0.01
Berlin	3	135,819	0.08
Bloss	10	463,071	0.26
Brookville	61	2,729,350	1.53
Brookville or Clarion	3	33,889	0.02
Clarion	11	157,679	0.09
Freeport	30	2,571,049	1.44
Fulton	13	799,246	0.45
Fulton and Barnett	6	154,932	0.09
Freeport and Kittanning	2	35,356	0.02
Kelly	17	621,079	0.35
Kittanning	9	226,946	0.13
Lower Freeport	225	12,813,625	7.18
Lower Kittanning B	384	25,114,437	14.06
Lower Kittanning and Upper Freeport	1	282,633	0.16
Lower Freeport and Lower Kittanning	6	194,035	0.11
Lower Freeport, Lower Kittanning, and Brookville	2	100,434	0.06
Lower Freeport and Middle Kittanning	5	114,244	0.06
Lower Freeport, Middle Kittanning, and Lower Kittanning	1	30,045	0.02
Lower Kittanning and Brookville	6	156,785	0.09
Middle and Lower Kittanning	1	35,972	0.02
Middle Kittanning	56	1,920,720	1.08
Middle Kittanning and Upper Freeport	5	167,079	0.09
Mercer	2	1,245	(a)
Pittsburgh	606	94,656,136	53.01
Pittsburgh and Upper Freeport	1	51,427	0.03
Pittsburgh and Redstone	7	366,115	0.21
Platt	1	42,892	0.02
Price	2	15,931	0.01
Price or Berlin	2	26,752	0.01
Redstone	11	353,828	0.20
Sewickley	29	1,154,016	.65
Seymour	4	341,682	0.19
Upper Freeport	240	15,438,723	8.65
Upper and Lower Freeport	40	4,886,500	2.74
Upper Kittanning	114	6,394,307	3.58
Upper Freeport and Lower Kittanning	2	275,572	0.15
Upper Kittanning and Lower Kittanning	6	156,035	0.07
Upper Clarion	2	20,656	0.01
Upper and Lower Freeport and Middle Kittanning	2	28,489	0.02

PENNSYLVANIA (continued)

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Upper Freeport, Lower Kittanning, and Brookville	1	26,004	0.01
Waynesburg	12	148,368	0.08
Not specified	922	4,940,175	2.76
	2,882	178,550,741	.....

VIRGINIA

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Ailey	1	20,366	0.20
Banner	2	55,483	0.54
Big Seam	1	2,142	0.02
Brush Mountain, Big Vein	1	3,250	0.03
Dorchester	3	372,000	3.62
Edwards	3	126,748	1.23
Haskell	1	12,000	0.12
Hog Wallow	1	79,487	0.77
Imboden	13	2,349,760	22.84
Jaw Bone	4	24,670	0.24
Jewell Pocahontas	1	73,911	0.70
Kelley	1	6,275	0.06
Kelley and Imboden	1	97,068	0.94
Lower Banner	5	128,441	1.25
Mohawk	1	60,400	0.59
Middle Norion	1	15,000	0.15
Nos. 1 and 2	2	159,414	1.55
Nos. 2 and 4	1	36,050	0.35
No. 3	4	1,121,568	10.90
No. 5	9	352,434	3.43
Nos. 5 and 7	1	66,903	0.65
No. 6	1	132,797	1.29
No. 1 Black Mountain	1	30,379	0.30
No. 3 Black Mountain	1	7,577	0.07
No. 6 and Jawbone	1	77,121	0.75
North Fork	1	8,000	0.08
Parsons	1	218,701	2.13
Price Mountain	2	39,440	0.38
Red Ash	4	130,496	1.27
Splash Dam	2	16,444	0.16
Taggart	1	674,941	6.56
Town Hill	1	60,173	0.59
Upper Banner	18	1,137,327	11.05
Upper and Lower Banner	2	1,658,762	16.12
Upper Banner, Lower Banner, and Widow Kennedy	1	22,600	0.22
Virginia Anthracite	2	79,554	0.77
Widow Kennedy	4	34,835	0.34
Wise No. 1	1	72,384	0.70
Not specified	88	724,907	7.04
	189	10,289,808	.....

WEST VIRGINIA

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Alma	10	417,073	0.43
Bakerstown	24	312,512	0.35
Bradshaw	2	39,341	0.04
Belmont	1	21,427	0.02
Beckley	42	4,159,491	4.63
Beckley No. 2	2	10,972	0.01
Beckley Fire Creek	1	61,700	0.07
Beckley, Pocahontas No. 3	1	116,878	0.13
Beckley & Sewell	3	304,047	0.34
Black Band	4	142,484	0.16
Campbell Creek No. 2	1	48,276	0.05
Cedar Grove	8	891,981	0.99
Chilton	22	1,577,647	1.75
Coalburg	34	2,466,532	2.74
Coalburg and Belmont	4	188,608	0.21
Coalburg and Cedar Grove	1	29,056	0.03
Coalburg and Lewiston	2	6,095	0.01
Coalburg Peerless	1	76,028	.08
Coalburg, Winifred, Thacker	1	152,951	0.17
Connellsville	1	47,254	0.05
Dorothy	1	97,319	0.11
Draper	1	46,834	.05
Draper and Dingess	1	50,869	0.06
Draper and Eagle	1	63,313	0.07
Eagle	28	1,713,178	1.90
Eagle No. 1	5	427,596	0.48
Eagle, No. 5, Splint	2	83,500	0.09
Eagle, No. 2, Gas	1	33,343	0.04
Eagle No. 2	3	231,676	0.26
Eagle Island Creek	2	216,132	0.24
Eagle Powellton	1	470,122	0.52
Eagle, Thacker, Island Crk	3	236,082	0.26
East Lynn	1	36,860	0.04
Elk Garden-Big Vein	1	29,480	0.03
Elk Lick	1	1,800	(a)
Fire Creek	23	914,272	1.02
Freeburn	3	218,274	0.24

WEST VIRGINIA (continued)

Name or Number of Bed or Seam	Production: No. of Mines	Production: Net Tons	Production: Percentage of State Total
Freeport	29	957,381	1.06
Freeport-Kittanning	1	28,427	0.03
Georges Creek Big Vein	2	91,937	0.10
Georges Creek Small Vein	1	11,901	0.01
Glen Alum	1	180,522	0.20
Iaeger	1	7,959	0.01
Island Creek	44	5,198,358	5.78
Island Creek Thacker	2	146,070	0.16
Kanawha	3	55,523	0.06
Kanawha, No. 1 Gas, No. 2 Gas, Amsted, and Eagle	2	259,973	0.29
Kanawha No. 5	4	164,429	0.18
Kittanning	27	1,350,168	1.50
Lewiston	6	225,596	0.25
Lewiston No. 2 Gas	1	15,150	0.02
Little Eagle	1	7,200	0.01
Little Pittsburgh	1	3,604	(a)
Lower Freeport	2	33,980	0.04
Lower Kittanning	24	1,410,533	1.58
Mahoning	1	1,248	(a)
Mason	1	6,270	0.01
Middle Kittanning	3	91,138	0.10
Mohawk	1	86,684	0.10
Masontown	1	16,690	0.02
No. 1	2	4,699	0.01
No. 1 Gas	3	197,517	0.22
No. 2	15	1,402,538	1.56
No. 2 Gas	53	2,387,471	2.65
No. 2 Gas and Coalburg	1	1,050	(a)
No. 3	3	186,123	0.21
Nos. 3 and 4	1	47,719	0.06
No. 5	4	384,946	0.43
No. 5 Block	23	846,927	0.94
No. 5 and Lewiston	4	110,138	0.12
No. 5 Splint	4	150,951	0.17
No. 7	2	142,554	0.16
No. 8	1	13,888	0.02
No. 8a	1	30,561	0.03
Peerless	4	61,291	0.07
Pittsburgh	197	13,509,518	15.02
Pittsburgh No. 8	33	2,607,012	2.90
Pittsburgh and Sewickley	1	44,296	0.05
Pittsburgh and Red Stone	1	51,359	0.06
Pittsburgh, Red Stone and Sewickley	1	172,532	0.19
Pocahontas	28	1,785,510	1.99
Pocahontas No. 3	62	10,810,422	12.02
Pocahontas Nos. 3 and 4	14	4,945,352	5.51
Pocahontas Nos. 3 and 6	1	35,880	0.40
Pocahontas No. 4	4	281,760	0.31
Pocahontas No. 7	1	96,422	0.11
Pocahontas No. 12	1	119,157	0.13
Pocahontas Sewell	1	30,550	0.03
Pomeroy	1	48,962	0.05
Pond Creek	2	56,781	0.06
Powellton	4	178,244	0.21
Queen	1	2,000	(a)
Quinnimont	2	53,037	0.06
Raymond	4	129,119	0.14
Red Jacket	4	255,492	0.29
Red Jacket Thacker	1	138,926	0.15
Red Stone	16	616,168	0.69
Sewell	92	6,647,680	7.39
Sewell No. 5	1	32,972	0.04
Sewickley	22	842,025	0.94
Thacker	15	542,716	0.60
Upper Freeport	25	1,056,194	1.17
Upper Freeport and Lower Kittanning	3	68,676	0.08
Upper Kittanning	2	9,779	0.01
Upper and Lower Kittanning	1	21,164	0.02
Upper Potomac	8	659,906	0.73
Upper Sewickley	1	3,640	(a)
War Creek	12	680,501	0.76
War Eagle No. 1	2	75,465	0.08
Waynesburg	3	18,398	0.02
Welch	5	246,574	0.27
Welch and Pocahontas	1	233,233	0.26
Westerley No. 1	1	155,715	0.17
Winifrede	18	1,212,056	1.35
Winifrede Coalburg	3	303,473	0.34
Winifrede, Coalburg, Freeport	1	83,858	0.09
Winifrede Pond Creek	2	172,230	0.19
Winifrede Thacker	3	149,488	0.17
Not specified	621	8,491,480	9.45
	1,745	89,935,839	.....

(a) Less than 0.01 per cent.

SWITZERLAND IMPORTED 233,804 metric tons of coal in September, 1920, as compared with 153,000 tons during the same month of 1919. This tonnage was obtained from the sources shown below:

	Metric Tons
Saare	26,105
Ruhr	17,754
Rhenish brown coal	13,810
Belgium	2,676
France	2,413
England	68,254
U. S. A.	100,592
Total	233,804

COAL PRODUCTION in the Ostrau-Karwin (Czechoslovakia) district in October, 1920, decreased by 26,320 tons or 3.91 per cent as against September, 1920, and amounted to 646,592 tons, compared with 672,912 tons in September, and 700,736 tons in August.

BRAZIL'S COAL MARKET is easing up, and the quality of both British and American coal now coming shows a marked improvement over past shipments. American coal is reported to be less in price than British, despite the low British rate of exchange.

To Control Combustion on Basis of Carbon Dioxide Alone Is Unsatisfactory

Loss Incurred Through Combustible Gases Passing Unburned Into the Chimney Is Far Greater Than the Saving Effected by an Equal Increase in Percentage of Carbon Dioxide—Instrument Has Been Devised that Continuously Analyzes the Flue Gas and Records the Component of Both Carbon Monoxide and Dioxide

BY F. D. HARGER*
New York City

IN THE OPERATION of boilers the efficiency of the furnace should be considered apart entirely from the boiler efficiency. The master key to the proper testing of furnace efficiency is a continuous gas analysis, such as not only measures the excess air present at all times but also promptly detects and measures the presence of combustible gases in the flue whenever they appear.

By a comparison of the curves in Figs. 1 and 2 an idea may be gained of the relative importance of two forms of fuel loss, arising: (1) From the escape of combustible gases into the stack whenever the air supply is insufficient and (2) from the introduction of excess air into the furnace. Fig. 1 shows the fuel losses which take place with varying percentages of carbon dioxide in the flue gases providing no combustible gases are present.

These vary inversely with the excess air supply. However, as the percentage of carbon dioxide is increased, or, in other words, as the air supply is decreased, there comes a time when combustible gases —carbon monoxide, methane and hydrogen—begin to form. The formation of these combustible gases causes a far greater loss than can be compensated by the saving which will be afforded by a decrease in the amount of admitted air or, what is the same thing, an increase in the percentage of carbon dioxide.

This is graphically illustrated in Fig. 2, wherein the portion of the curve indicated by *C B* represents fuel losses that develop beyond the point *C*. Here combustible gases begin to form as the air supply is decreased and as the carbon-dioxide percentage is accordingly increased.

The point *C* is the critical point. It is the region where combustion takes place with the greatest economy in fuel. The position of this point varies not only in different furnaces but changes constantly within the same furnace.

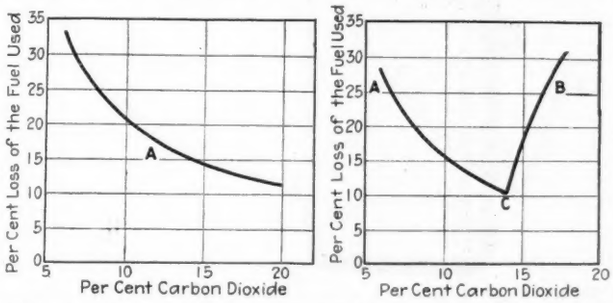
Recently an instrument has been perfected and placed on the market which not only accurately analyzes and records the percentages of carbon dioxide present in flue gases but also detects and clearly records on the same chart the presence and the approximate proportion of combustible gases as soon as they appear.

This instrument, manufactured by the Mono Corporation and the invention of Olof Rodhe, is so sensitive and accurate in the performance of this function that it will unfailingly detect and record the presence of even such minute fractions as $\frac{1}{10}$ of 1 per cent of combustible in the flue gases. Even this slight proportion is shown on the chart, so that the operator at a glance can clearly discern its presence. The existence of combustible gases being once established, the accurate determination of their actual percentages is of no great importance. The instrument indicates approximately the degree in which they appear, and this is sufficient for the guidance of the fireman. The actual percentage of combustible gas present is rarely less than two-thirds of the amount recorded on the chart and is seldom more than equal to the recorded amount.

Fig. 3 represents a diagram made by one of these instruments. The darker contour accurately shows the percentages of carbon dioxide present at all times. The lighter areas in the diagram indicate the presence of combustible gases, the proportion of which is roughly indicated by the height of the lighter areas at any particular time.

This diagram shows the condition found in a boiler plant at the time the instrument was first connected. Certain changes were made in the furnace, the nature of the fuel and the method of firing, with the result that conditions as illustrated in Fig. 4 were obtained. In this diagram it is seen that the carbon-dioxide content could be carried to a point as high as 13 per cent without the formation of combustible gases. In other words, the critical point, or that at which carbon monoxide began to reach the flue, was raised several per cent, resulting in a saving of 20 per cent of the fuel. Where the dark contour goes below the critical point, too much air is supplied or the air is improperly distributed. Where, on the other hand, it rises above the critical point, that is, the point where light areas begin to show, the supply of air is insufficient.

The apparatus itself (see Fig. 5) is driven by water under a pressure of about 10 lb. per square inch. Before entering the instrument the gas samples from the flue are drawn through a filtering system, that removes



FIGS. 1 AND 2. CHARTS OF THEORETICAL AND ACTUAL FURNACE OPERATION

These show respectively the loss of fuel with given percentages of carbon dioxide when all the combustible gases are consumed and the loss of fuel with given percentages of carbon dioxide under actual conditions of operation. Enough air must be admitted to burn all the combustible gases or more heat is lost than economy in the use of air will save.

*Vice-president and general manager, Mono Corporation of America.

FIGS. 3 AND 4

Charts for Ill- and Well-Adjusted Furnace

The dark area represents carbon dioxide percentage and the lighter area indicates roughly the amount of escaping unburned combustible gas. In Fig. 3 wherever the carbon dioxide content exceeds 10 per cent the line adjacent by its superior length evidences the presence of unburned combustible gas. In Fig. 4 the furnace has been adjusted and the amount of unburned gas is small.

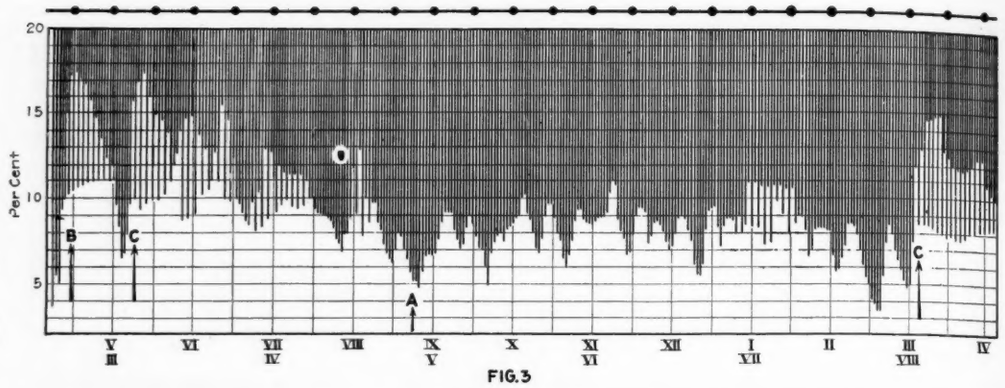


FIG.3

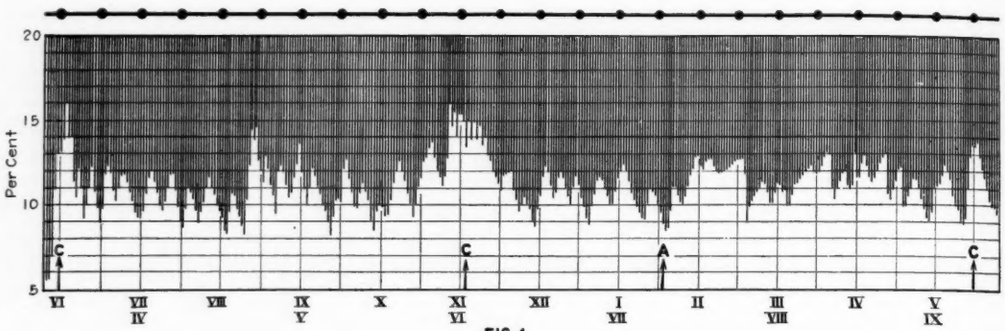


FIG.4

all soot and dirt. They are then drawn into and forced through the apparatus by a mercury piston. There are no mechanical valves, the functions of such parts being performed by various mercury seals, traps, etc.

Samples of gas are forced alternately through two routes, one leading directly through a caustic-potash tank, where carbon dioxide is absorbed, and the other first through an electrically-heated furnace, wherein the combustible gases are first oxidized to carbon dioxide and water, and then passed through the caustic-potash tank. Samples that are forced through the caustic-potash tank give the readings only for carbon dioxide.

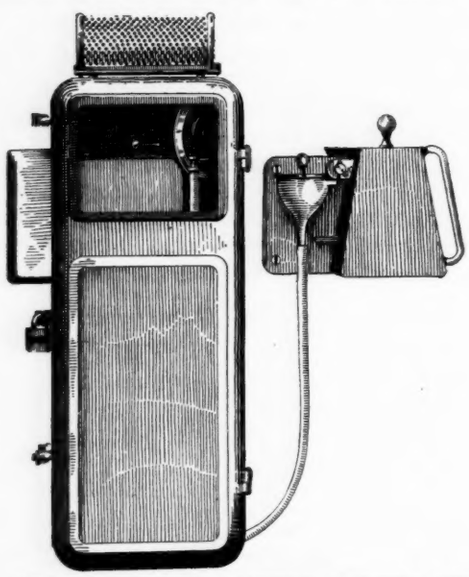


FIG. 5. RECORDER SHOWS CARBON DIOXIDE PERCENTAGES AND INDICATES PRESENCE OF COMBUSTIBLE GAS

This recorder takes samples of flue gas, finds how much carbon dioxide is in them and rules a line to accord therewith. It also burns the combustible gas in them, measures the carbon dioxide and the water vapor in the sample after burning and records the combined volume. As a result a line is ruled which shows by difference the carbon dioxide and water resulting from the completed combustion and exhibits roughly how much combustible gas is going up the stack unburned.

Those that are first forced through the electrically-heated furnace and then through the caustic-potash tank, give readings of the carbon dioxide in the natural stack gases plus the carbon dioxide and water derived from the combustion of the combustible gas in the stack. The difference between any two successive readings is proportional to the amount of the combustible gases present at the time the analyses are made.

In the electrically-heated furnace the oxygen necessary to oxidize the combustible gases and form carbon dioxide (which is later absorbed in the caustic-potash tank) and water (which is condensed) usually is derived from the air which is almost invariably present in flue gases even when they contain combustible. When such free oxygen is not available this gas is taken from copper oxide placed in the furnace for the purpose. The material, however, probably seldom acts as anything but a catalytic agent and need never be renewed.

The apparatus is practically dustproof and requires only a slight amount of attention, which consists in winding the clock once a week, renewing the caustic-potash solution two or three times a month, replenishing the ink supply twice a month and putting in new rolls of paper once every two months.

The carbon-dioxide records of the machine are extremely accurate. This makes possible the close determination of the critical point at any time under any conditions. This critical point, as mentioned before, is the highest percentage of carbon dioxide that can be reached in a given furnace without the formation of combustible gases. The higher it can be raised, the more economical is the process of combustion. Knowing its maximum from the clear and accurate records of the instrument, the fireman has available a constant indication of how near he is approaching ideal conditions. Should combustible gases appear at a percentage below the critical point, he knows that his dampers, fire doors, or the fire itself needs immediate attention. This his experience soon teaches him to give to the best advantage.

Froth Flotation for Cleaning Coal Being Tried Out in England

SMALL-SCALE experiments have been made by the Skinningrove Iron Co., of Saltburn-by-Sea, England, into the cleaning of coal by flotation. These were briefly described in a paper by Arnold F. Bury and Arthur B. Bicknell at a meeting of the Newcastle section of the Society of Chemical Industry held on Jan. 26 of this year.

A special laboratory was fitted up and machinery installed capable of dealing with samples up to 112 lb. The coal tested may briefly be said to consist of a mixture of (1) pure coal having a low ash of from 2.5 to 5 per cent, (2) bone coal having an ash of from 10 to 16 per cent, (3) shale containing a varying amount of bituminous matter and an ash of 60 to 85 per cent, (4) small quantities of other impurities such as gypsum and pyrites.

The shale, gypsum and pyrites could be removed by mechanical means if the coal were crushed sufficiently fine to free it from the impurities, but the bone coal presents a more difficult problem, for it cannot be removed even when the coal is ground to pass a 200-mesh screen, but the flotation process seems to meet this difficulty with satisfaction. The table shows the results obtained.

		1st Concentration		2d Concentration		1st and 2d Concentration		Residues	
	Ash	Weight	Ash	Weight	Ash	Weight	Ash	Weight	Ash
Freshly Mined									
No.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	12.4	78.6	3.1	9.2	10.1	87.8	3.8	12.2	72.4
2	24.2	62.7	3.4	13.2	14.5	75.9	5.2	24.8	78.5
3	15.8	81.1	3.0	2.1	19.3	83.2	5.4	16.8	75.0
Washery Refuse									
4	49.0	19.6	7.0	11.5	13.3	31.1	8.7	68.0	65.5
5	65.7	13.2	14.2	12.2	35.5	....	....	74.6	79.3
Pit Refuse									
6	53.3	30.4	5.1	4.6	15.1	....	....	65.0	77.5
7	28.2	38.4	7.0	13.9	13.5	52.3	8.2	44.3	63.5
Dumps									
8	47.4	33.3	8.7	4.4	36.9	....	....	62.3	73.6

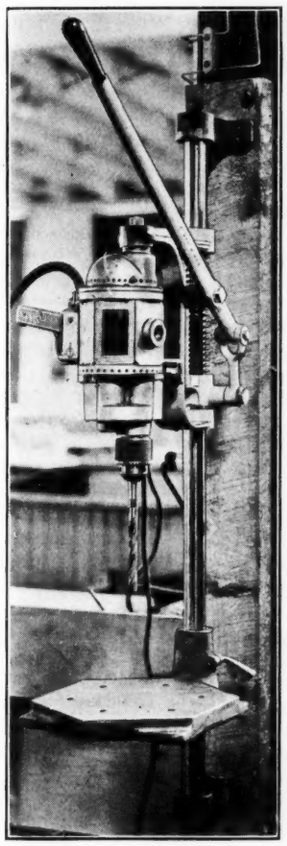
When certain reagents are added to small quantities of water and the whole is agitated violently, a multitude of minute air bubbles are formed. On allowing the liquid to come to rest the bubbles do not coalesce but remain distinct from each other and rise slowly to the surface, where a more or less permanent froth is formed. The reagents that can be used for the purpose are many, including certain oils, such as turps; soluble organic substances, such as cresol; certain alcohols, such as amyl alcohol, and soaps. The proportion of reagent required is small, amounting to a fraction of a pound of reagent to a ton of water. Particles of metallic sulphide, coal and graphite readily float on the froth, but sand, clay and similar earthy materials sink to the bottom.

If the mine product comprises pure coal, carboniferous shale and clay, the pure coal can be recovered, after which, by adding a small quantity of the oily reagent, the carboniferous shale can be separated, the clay being finally left behind. Flotation by this process does not depend on the specific gravity of the particles, for some substances, such as galena, which are most readily floated, have a high specific gravity.

A plant capable of dealing with 600 tons a day is being built at Skinningrove and it is conservatively estimated that by the use of the process 10 per cent increase in carbon in the coke will be obtained, with increases in gas and byproducts. The saving in the production of pig iron that will be effected is estimated at 75c. per ton. It is also said that waste liquor from naphthalene is an efficient agent for floating coal.

Post Designed to Permit Portable Electric Drill To Be Used as a Drill Press

MEANS by which a portable electric drill may be adapted for use as a post machine, making it practically a drill press, are shown in the accompanying illustration. This device enables the portable machine to do, with at least reasonable precision, either the heavy work of a drill press or ordinary drilling work. The machine may be attached to, or detached from, the post in a few seconds. All parts of this device are of rugged construction and generous proportions. The column is a solid steel shaft $1\frac{7}{16}$-in. in diameter attached to wall or post by means of heavy brackets. This post attachment is designed to take drills of $\frac{3}{8}$ in. to $\frac{7}{8}$ in. capacity, any of which can be attached or detached quickly. The bracket carrying the drill can be raised, lowered or rotated sidewise and is secured in any desired position by means of a split collar and clamping screw. A spiral spring returns the drill to its upper position when the feed lever is released. Provision also is made for raising, lowering or swinging the table. Both vertical and horizontal adjustments are made secure by means of a clamp screw. The chief dimensions of this device are as follows: Length of vertical column, 46 in.; vertical adjustment of drill, $25\frac{1}{4}$ in.; drilling radius or distance from center of drill to surface of drill column, 7 in.; horizontal adjustment of drill, 180 deg.; feed, vertical travel of drill under action of feed lever, $4\frac{1}{2}$ in.; net weight, 80 lb. The feed lever is long and affords a ratio of 6: 1, so that, say, 100 lb. pressure applied to the lever gives 600 lb. on the drill bit. This, of course, means rapid work accomplished with small effort on the part of the operator. Six half-inch holes are tapped in the table to receive studs carrying clamps that hold the work in place. One stud with clamp and nut is supplied with the stand.



PORTABLE DRILL ON WALL POST

By providing a wall post with suitable bracket an electric drill can be adapted to ordinary blacksmithing work.

This unit, as may readily be understood, is unusually flexible. For this reason it makes an especially efficient device for use in such places as mine-car shops, where the majority of the work handled comes well within its range. It is built by the Black & Decker Co. for use in conjunction with the portable electric drills which that firm manufactures.

Problems of Operating Men

Edited by James T. Beard

Difficulties Met in Working the Redstone Coal

Experience Gained as a Miner, in the Working of the Redstone Seam, Serves to Solve Some of the Difficulties of the Problem, When Later Taking Charge as Foreman of Another Mine Operating in the Same Seam and Subject to the Same Conditions

READING the inquiry of an operator in the Pittsburgh district, who states that he has in contemplation the development of a tract of 200 acres of the Redstone coal, recalls my own experience, first as a miner and then as a foreman of a mine working that seam, in the Meyersdale region.

The inquirer asks for information regarding the quality of the coal and the difficulties that are likely to be met in the undertaking he has in prospect. He states that all the coal in the underlying Pittsburgh seam has been worked out in that tract. Regarding the quality of the Redstone coal I can say little that would be of help, but will enumerate some of the difficulties encountered in the working of the seam, hoping that my narration will be of some assistance.

Observations in the Meyersdale District, Redstone Seam

More than one-half the coal of the Meyersdale district was being mined from the Redstone seam, at the time to which I refer. For a considerable period, I was engaged digging coal as a miner. In every mine where I worked, my observation showed that the rooms were driven on 36 ft. centers and had a width of 5 yd., which made the width of the room pillars 21 ft.

Many a bad break have I seen in the rooms; at times, these would cut out the coal entirely. When that happened it was seldom that we were able to drive ahead. It was generally necessary to let the place stand and come back later on the coal from an adjoining room.

Often, I have seen the floor drop away from the coal several inches, and this condition would be extended through a number of rooms on the entry. Great care was then necessary to sprag the coal ahead and avoid taking down too much of the face at a time. Of course, this trouble resulted from the broken condition of the floor and roof caused by the extraction of the coal in the underlying seam.

On several occasions large breaks would be followed by heavy roof falls. Timbering seemed to have little effect to prevent this, as the broken roof would fall in spite of the timbers, and it required the miner to watch carefully in order to avoid being caught. To say the least, the condition was discouraging and called for the utmost forethought and skill on the part of both the foreman and the miner.

Working Out a Plan Based on Observation and Experience

Later, when called to take charge of a mine as foreman, in that district, I started to work out a system suggested by my observations and experience at the time of mining this coal. The plan, which I adopted after considerable study, was one that I thought would eliminate at least some of the troubles. But, while the methods employed were successful in part, we were still hindered by breaks and falls that would frequently cut us off and make it necessary to work around and come back on the coal, as before.

Working around in this manner would often cause poor ventilation at the coal face; but this was improved by stretching a line of canvas or brattice to carry the air forward, which we had to do to keep the face clear so that the men could work.

Reducing the Number of Breaks

As foreman, one scheme that I followed was to secure a map of the lower workings whenever this was possible. Then, by planning the work in the Redstone seam so that the openings would cross those in the seam below, we were able to reduce the number of breaks, which has been the source of most of the trouble previously.

Another plan that proved very helpful was the system we adopted of driving the headings narrow, not to exceed 10 ft. in width, and turning the rooms on 40-ft. centers, or larger when this seemed advisable. The seam was subject to creeps or squeezes, and the larger pillars left in the first working proved a great help in overcoming this difficulty.

One thing that seems surprising is the few accidents that have occurred in mining under these conditions. This can be attributed chiefly to the fact that the miner knows that he must watch and keep his timbers close to the face of the coal. Often have I found it necessary to change the system according to the changes observed in the direction of the breaks in the roof. Occasionally, it would be necessary to drive ahead to ascertain this fact.

In closing, let me say I frequently feared the coming of the mine inspector, for the reason that the conditions under which we were compelled to work rendered it almost impossible at times to make the necessary clearance required by law. This necessity was frequently admitted by the inspector himself. I hope sincerely that these brief comments may be of some value in reference to working the Redstone coal.

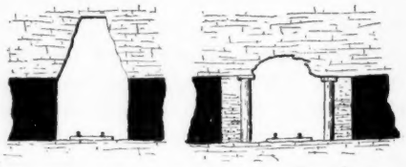
Pittsburgh, Pa. OPERATOR.

Avoiding Roof Troubles in Mining

Emphasizing the suggestions made in regard to overcoming the tendency of a jointed mine roof to develop heavy sudden falls that give no warning. Analagous conditions observed in the No. 4 seam, in Indiana, to those said to exist in the Miller, or B seam, of the Central Pennsylvania bituminous field.

READING the interesting article of Alfred E. Roberts, *Coal Age*, Jan. 13, p. 57, I am reminded that the troubles he describes as experienced in the mining of the Central Pennsylvania "B seam," in many respects resemble the conditions that exist in portions of the Indiana coal beds.

Roof troubles experienced in mining the coal from No. 4 seam, in Indiana, have caused me to devote many hours of deep study in striving to overcome



OVERCOMING CUTTING ACTION OF AIR ON ROOF IN NARROW-WORK

them. A most troublesome feature in this seam is the cutting action of the roof when driving narrow-work.

Owing to some cause, which many mine officials describe as phenomenal, but that seems to me is the result of violating a principle of mining, the roof of a narrow entry will fall, cutting upward almost vertically on each side, as indicated on the left, in the accompanying figure.

An entry eight or nine feet in width will often develop a fall several yards in length and from six to eight feet in

height above the rail. At the top of the fall the opening will be only three or four feet wide. This condition can be seen in the No. 27 mine of the Vandalia Coal Co., in this district. The cutting action is more prominent in those entries running north and south, but develops to a less degree in entries running east and west.

The closest observation failed to reveal any slips that would have started the fall. The mine boss (foreman) believed that the trouble was chiefly due to the entries having too small an area, which gave rise to a greater velocity of the air current than was found in the rooms, where the trouble was not as manifest as on the entries.

It was also thought it might be due to moisture, as an air current is more apt to deposit moisture on entering the mine and passing through the airways than when traveling in the rooms, as the variation in temperature is greater on the airways.

Blasting Weakens the Mine Roof

At another time, I was employed in No. 16 mine of the same company, where there was much narrow-work and the same trouble was manifest. It was a condition that resisted all efforts to timber or prevent the fall, until the roof had broken to a height that was self-supporting.

One thing that seems to me may have an important bearing on the question and explain why this trouble is more manifest on the entries than in the rooms has reference to blasting. In entrywork, the shots are generally put closer to the roof and there is less freedom for the charge to perform its work. The result is that the roof of the entry is submitted to a greater shock, which would naturally weaken its structure and give it a greater tendency to disintegrate and fall.

Wide Openings Make Roof Elastic

Arguing from this standpoint, I strongly advise driving the entries, say 12 ft. wide, which will give an opportunity for standing posts on each side of the track, as shown on the right of the figure. In most cases, this will not only have the advantage of avoiding the payment of yardage, but there will be provided ample space for storing the fallen refuse at the side of the track.

In the article to which I have referred, reference has been made to the greater elasticity given to the roof material through the opening up of a larger area. This is an element that I have thought operated to give less trouble in the rooms, which were often driven a width of 30 ft.

There is no question but that a greater width of the opening would give an increased freedom in the room and reduce, to that extent, the severe strain arising from the taking out of the coal. I would advise setting good timbers in the wide entries mentioned. The posts should have a diameter not less than one-eighth of their length.

Let me say that opening a mine, under these conditions, on the triple-entry system and driving a caving room as close as possible to each back entry and parallel to it, after the plan suggested in the article previously mentioned, appeals strongly to me. Other caving rooms can also be driven in suitable and convenient positions for the purpose of relieving the roof pressure on adjoining openings.

The suggestion of driving openings, as far as practicable, at an angle with the joint-planes in the roof of a coal seam, is a good one. Most of the systems of mining being in rectangular form, will require driving all openings at an angle of about 45 deg. with the joint-planes in the roof.

Better Roof Support Afforded When Openings Cross Joint Planes

The suggestion of the simultaneous development of all the workings in a given area, with a view to reducing the roof troubles mentioned, would seem to ponit to the adoption of the panel system of mining, which to my mind is a wasteful method and gives a low percentage of extraction.

It seems to me that a much higher percentage is often claimed for panel work than is actually experienced in that system. The form of the panel system in vogue, in this district, affords little or no opportunity for driving caving headings, which I consider an important feature.

By way of summation, let me say I favor a less production of coal in the first working and leaving large pillars to be taken out by machine on the retreating system. This in brief, is the plan that appeals to me as promising the greatest success.

Linton, Ind. W. H. Luxton.

Practice in South Wales Mines

Observation and experience show that the methods employed in the mining of coal in South Wales are the chief factors in limiting the output, per man per day, in those mines.

FOR a period of nearly twelve years I was employed in practically every class of work performed in the mines in South Wales, from trapperboy to fireman (fireboss). That experience, together with my later observation and experiences in the mines of this country, convinces me that the man who has not had similar opportunities to compare the results of miners in both countries is not competent to judge as to why the American miner puts out more coal, per day, than a miner in the old country.

While a man may visit one or more mines, in Great Britain and elsewhere, and observe the different methods of mining and transporting the coal, he is in no position to judge of the comparative merits of these different ways of working, like the man who has had the actual experience and performed work under the different conditions that exist in those countries.

Even in this country, conditions that influence the output, per man per day, are different in different mines. For example, a man may prove to be a champion coal digger in a mine where he has worked previously; but, on going to another mine, he finds his capacity for producing coal is handicapped by conditions that he cannot control, although the second mine may be working the same seam as the first.

There are many reasons why the average output, per man per day, is greater in the mines of this country than in Great Britain. Attention has been drawn, in previous letters on this subject, to the fact that the greater depth of shafts, the comparative thinness of the coal seams, and the more extensive development of the mines, necessitating a greater length of haul underground, all operate to reduce the daily output of a miner.

Creep or Squeeze Cause Trouble

In addition to these causes, the mines in South Wales are practically all worked on the longwall system, and are subject to squeeze and creep, which proves a great hindrance to the mining of the coal. Some of the mines are more affected in this manner than others. Where the creep is continuous, as sometimes happens, it requires a large force of daymen to keep the roads open.

At the Cambrian Collieries, Clydach Vale, in the Rhondda Valley, there were at one time a thousand men employed on the nightshift for brushing the roads, repairing track where the bottom had heaved, and timbering. The force included overmen, rippers, timbermen, drivers, rope riders, cagers, besides daymen and topmen.

Again, the miner in South Wales is not paid for fine coal and slack, which are thrown back into the gob. For this he receives no credit. He is not allowed to load his coal with a shovel but must use a "curling box," which he must fill by hand with clean coal, making the process of loading a car slow work.

No Machines a Handicap

In South Wales, there are no mining machines, all the coal being mined by hand. Much of the coal is tough and, after being undermined and sheared, must be broken down by sledge and wedge. Under these conditions, the output of a good miner will not exceed two tons a day. This estimate, moreover, is based on the miner alone and does not include drivers, timbermen, trackmen and others working in the mine.

Conditions in most of the mines in South Wales are such as to make the use of locomotives for hauling the coal impracticable. As a result all of the haulage is performed by endless or tailrope haulage.

These conditions should make it clear to anyone that no true comparison can be made between the output, per man per day, of miners in the two countries. Such a comparison would do an injustice to the ability of coal miners in Great Britain and should not be attempted.

Stoyestown, Pa. Griff Griffith.

Standardizing Rules in Mine Timbering

Discussing the need and practicability of formulating a set of standard rules regarding the setting of post timber at the working faces in mines.

REFERRING to the attempt of the Pennsylvania Compensation Rating and Inspection Bureau to ascertain if a standard set of rules could not be drafted that would provide for the setting of posts at a uniform distance from the face of the coal, this may naturally meet with some opposition in different quarters, but it will be generally agreed is a step in the right direction.

From the account given in *Coal Age*, Jan. 6, p. 15, it appears that the committee appointed to look into the matter made numerous practical tests, which showed that posts set three feet from the coal were not shot down, except where black powder was used.

It was also shown that the distance of three feet gave ample space for sumping a shortwall machine, though it did not afford sufficient room to operate a breast machine, without removing the props.

While it appears that no conclusion was reached at this hearing, it is stated that the matter was held over for another year, in order to give time for collecting further data and making other tests.

It is to be hoped that these efforts will be continuous, until some standard rule relating to the timbering of the coal face in a mine is reported and adopted. Only by this means can it be expected to reduce the number of accidents from falls of roof and coal at the working face.

Accident Statistics Show the Need of Standardization

Of the 879 fatal accidents that occurred in the four-year period, 1816-1819, inclusive, 490 of these accidents occurred when the men were working at the face, either mining or loading coal. This high percentage should strongly urge the need of some practicable means or plan for adoption.

When a practice involving certain principles of safety is left to men's judgment, there easily results a wide margin of practice. In the majority of instances, the question of safety is made subordinate to getting results in the mining of the coal.

There are rules and regulations regarding the use of explosives and methods of blasting the coal. The practice of blasting has been standardized, in many mines, with the result that shooting off the solid is no longer permitted and permissible powders that are adapted to the hardness of the coal, thickness of the seam and other conditions, have replaced the black powder formerly used.

Again, the matter of lighting and the use of open lights and safety lamps, have come to be regulated by rules adapted to the conditions in particular mines. Different types of lamps have been tested and approved by the Government Bureau of Mines. All of these steps have served to reduce the mine-accident list.

It goes without saying that a standard rule of practice is the backbone of discipline. Why should we not standardize as far as practicable the methods of post timbering at the working face in mines. I understand the mine foremen in parts of Europe carry with them a stick or cane of a specified length and where props are found set farther apart than a specified distance, the miner is compelled to reset them.

While it is true there are many miners who need no watching, but set their timbers in a way to insure the maximum of safety for themselves, there are many others who will not do this except as they are compelled to it, by the strict enforcement of a rule or law that specifies how the timbers must be placed. For this reason, the adoption of a recognized standard is most to be desired. Such a standard, once adopted, will be a large factor in reducing the accident list of today.

Thomas, W. Va. "SAFETY FIRST."

Inquiries Of General Interest

Composition of Natural Gas

The Claim of Miners That Firedamp in Mines Is Detected by Its Smell Leads to the Inquiry of What Other Gases Are Associated with Methane That Would Create the Odor So Often Ascribed to That Gas

KINDLY give the general composition of natural gas. I ask this information, because a large number of miners claim that they can detect the presence of firedamp by its smell.

Since all mining textbooks and chemistries state that methane or marsh gas, which is the chief constituent of firedamp, is odorless, it seems to me that the smell attributed by miners to firedamp must be caused by the presence of other gases.

If these other gases, occuring with methane as feeder gas, are also odorless, it may be that the odor detected by miners is due to the gas having percolated through some oily deposits.

The claim of odor in firedamp is so general among old miners that it cannot be set aside as being without foundation. Any experienced fireboss will freely admit that he has often perceived this odor, and has come to take it as an indication of the presence of gas.

Many firebosses do not hesitate to state that they are positive firedamp has an odor that is characteristic and gives warning of its presence before any test is made for the gas. What light can *Coal Age* throw on this matter?

Bicknell, Ind. N. E. MOSBEY.

It is true that pure methane is described in all textbooks as being odorless. That fact has been determined by the manufacture of the gas in a pure condition, in the chemical laboratory, and is not to be disputed. On the other hand, the firedamp found in mines is never pure methane, but contains other gases besides.

This is not the first time that the attention of *Coal Age* has been drawn to the claim of miners that firedamp, in mines, is easily detected by its smell, provided one has had the experience that would enable him to recognize the particular odor, which is described as being peculiar to firedamp.

There are associated with methane, occurring as feeder gas, a few other hydrocarbons, the principal one being ethane (C_2H_6). The olefine gases, of which the most common representative is olefiant gas (C_2H_4), are rarely found in appreciable quantity associated with methane.

Traces of olefiant gas have been reported, in several instances, but generally less than 1 per cent of the mixture. Also, small percentages of carbon monoxide (CO) and somewhat larger percentages of carbon dioxide (CO_2) are found in gas coming from natural feeders.

Practically all of these associated gases, just mentioned, like methane, have no odor, with the exception of a slight pleasant odor attributed to olefiant gas. The presence of this gas in appreciable quantity, however, is so rare in the mines that it will not explain the odor ascribed to firedamp.

In this connection, it is interesting to note a statement made in Bulletin 148, published by the U. S. Bureau of Mines, entitled "Some Physical Properties of Petroleum and Gases," by J. O. Lewis. Mr. Lewis draws attention to the fact that certain oils absorb gas, which is held in solution as a liquid in the oil.

These gases belong to the olefine group. They have been styled "wet gases," in distinction from other so-called "dry gases," that are not condensible to the liquid form. Methane and ethane belong to the paraffin group and are dry gases.

In discussing the dry and wet hydrocarbon gases a short time ago, James Ashworth, mining engineer, drew attention to the vaporization of the oil contained in the Mahoning sandstone, in Ohio, as being a possible source of natural gas of a dangerous character, generated in large quantities by the vaporization of the oil.

The inquirer, here, has suggested that the odor associated with firedamp may arise from the filtering of the gases through a deposit impregnated with oil. It would seem more likely, however, that the alleged odor of firedamp arises from the presence of one or more of the so-called wet hydrocarbon gases, set free by the vaporization of the oil.

The bulletin to which we have referred is authority for the statement that enormous quantities of gas are held in solution by the oil, under the high initial pressure to which the oil is subjected in the measures. The release of this pressure, by the extraction of the coal in the seam and the subsidence of the overlying strata, is accompanied with the rapid vaporization of the oil and generation of gas.

In conclusion, it may be stated that Mr. Ashworth, who has devoted much time to the study of the generation of gas in mines, believes that some of the enormous outbursts of gas, notably those that occurred in the Morrisey Colliery of the Crows Nest Pass Coal Co., Alberta, Canada, in 1903 and 1904, and which finally lead to the abandonment of that mine in 1909, resulted from the vaporization of these liquid hydrocarbons that have since been styled as "wet gases." *Coal Age* will be glad to hear from others.

Examination Questions Answered

Examination for Mine Foremen, Seventeenth Anthracite District

(Selected Questions)

QUESTION — *If the return air-course becomes contracted in area what effect has this upon the water gage and the quantity of air, the ventilating power remaining the same?*

ANSWER — In fan ventilation, if the fan is properly designed to suit the conditions in the mine regarding its ventilation, any obstruction of the airways whereby the sectional area is reduced, will have the effect to increase the reading of the water gage, while the quantity of air in circulation will be decreased in the same proportion, if the ventilating power remains unchanged.

QUESTION — *How many cubic feet of air will pass per minute through an air-course 5 x 7 ft. when the current is traveling at the rate of 20 yd. in 15 seconds?*

ANSWER—A current traveling at the rate of 20 yd. in 15 seconds represents a velocity of $(3 \times 20) \div 15 = 4$ ft. per sec., or $4 \times 60 = 240$ ft. per min. The sectional area of this airway is $5 \times 7 = 35$ sq.ft., and assuming the velocity given is an average for the entire area of the airway, the quantity of air in circulation is $35 \times 240 = 8{,}400$ cu.ft. per min.

QUESTION—*If the roadway where the air travels be doubled in length, how much will the resistance be increased?*

ANSWER—Assuming the power on the air is constant, if the length of an airway is doubled, the velocity of the current will vary inversely as the cube root of 2, or $1/\sqrt[3]{2} = 1/1.26 = 0.793$. But, the resistance of an airway varies directly as its length and as the square of the velocity of the current; or as $2 \times 0.793^2 = 2 \times 0.628 =$ say 1.25. Therefore, to double the length of an airway, when the power on the air remains constant, will increase the resistance one-fourth of what it was previously.

QUESTION—*What instruments are required by a mine foreman, in order to efficiently fulfill his duties? Explain the use of each?*

ANSWER—The mine foreman requires an anemometer, for measuring the velocity of the air current by observing the reading of the dial after the instrument has been exposed for one minute in the airway. He requires a water gage for measuring the ventilating pressure. Multiplying the reading of the water gage, in inches, by 5.2 gives the difference of pressure, in pounds per square foot, between the intake and return airways.

The foreman should have a hygrometer, for measuring the humidity of the mine air, which is calculated from the difference in the readings of the wet- and dry-bulb thermometers. The dry-bulb thermometer of this instrument gives the temperature of the air.

The foreman should observe, regularly, on entering and leaving the mine, the reading of the mercurial barometer, which should be located at or near the mine entrance, on the surface. The rise or fall of the mercury column shows a corresponding increase or decrease of atmospheric pressure.

The mine foreman needs a magnetic compass, for giving sights and determining bearings in the mine. In steeply pitching seams, the foreman should have a clinometer, for measuring the angle of pitch. He must also carry with him a measuring tape for measuring distances and checking the widths of rooms and pillars. In a gassy mine, the foreman must carry his safety lamp with him; and he should have, besides, some form of gas indicator, either the Beard-Mackie sight indicator, or the Burrell gas detector, for determining the percentage of gas present.

QUESTION — *What is the difference between natural and artificial ventilation?*

ANSWER—Natural ventilation differs from that which is artificial in that the former is dependent wholly on atmospheric agencies, such as the difference in temperature of the mine air and the outside atmosphere; the force of wind exerted at the mine opening or diverted into the mine by some mechanical contrivance such as a wind cowl. Natural ventilation is also, at times, effected by means of a waterfall in the shaft.

On the other hand, artificial ventilation is produced by some mechanical means such as a ventilating fan; or is induced by the heat of a furnace located in the mine at or near the foot of the upcast shaft; or by the force of a steam jet or blower in the shaft.

QUESTION — *Given an arched airway 10 ft. in diameter, with a semicircular arch springing 5 ft. above the floor, and the velocity of the air 500 ft. per min., what would be the quantity of air passing, in cubic feet per minute?*

ANSWER — The arch being a semicircle, its diameter is the width of the airway. The area of the rectangular portion of the airway is, then, $5 \times 10 = 50$ sq.ft. and that of the semicircle $\frac{1}{2}(0.7854 \times 10^2) = 39.27$ sq.ft., which makes the total sectional area of the airway 89.27 sq.ft. Taking the average velocity of the air as 500 ft. per min., the quantity of air passing, in this airway, is $500 \times 89.27 = 44{,}635$ cu.ft. per min.

QUESTION—*If the velocity of the air, in an upcast shaft 14 ft. in diameter, is 1,100 ft. per min., how much air is there returning from the mine?*

ANSWER—The sectional area of this shaft is $0.7854 \times 14^2 = 153.9$ sq.ft. Then assuming the average velocity of the air current passing up the shaft is, as given, 1,100 ft. per min., the quantity of air returning from the mine is $1{,}100 \times 153.9 = 169{,}290$ cu.ft. per min.

QUESTION — *If the water gage reads 3½ in. what is the pressure per square foot producing the circulation?*

ANSWER—The unit ventilating pressure corresponding to a 3½-in. water gage is $3\frac{1}{2} \times 5.2 = 18.2$ lb. per sq.ft.

QUESTION — *If the quantity of air passing is 60,000 cu.ft. per min. and the water gage 2 in., what is the horsepower producing the circulation?*

ANSWER—First, the pressure producing circulation is $2 \times 5.2 = 10.4$ lb. per sq.ft. The horsepower of the air is found by multiplying the quantity of air in circulation, by this unit pressure and dividing the result by 33,000; thus $H = (60{,}000 \times 10.4)/33{,}000 = 18.9$ hp.

QUESTION—*How much will the power have to be increased to increase the quantity of air in circulation from 10,000 to 15,000 cu.ft. per min.?*

ANSWER — The power on the air varies as the cube of the quantity of air in circulation, other things remaining unchanged. In other words, the power ratio is equal to the cube of the quantity ratio. Therefore, in this case, since the quantity ratio is 15:10 = 1.5, the power ratio is $1.5^3 = 3\frac{3}{8}$. Hence, it will require $3\frac{3}{8}$ times the original power to accomplish the desired result, in this case by increasing the power.

Washington Coal Dealers Indicted on Charge of Conspiracy in Restraint of Trade

TWELVE coal dealers of the District of Columbia were indicted by the District of Columbia Grand Jury on March 3 for violation of the Sherman Anti-Trust Act on the ground of conspiracy in restraint of trade in coal in Washington. The indictments follow the charges made before the Senate Manufactures Committee on the coal bill that a local coal association had driven other coal men out of business for cutting prices.

The indictment charges that about March, 1918, the defendants adopted a method for preventing the small dealer from encroaching on their business; that they obtained control of supplies from the mines and of the single wholesale concern—the Standard Co.—from which the local small dealers obtain their supplies when they could not get them from large dealers; with persuading small dealers to join the Coal Merchants Board of Trade, of which, it is alleged, the accused dominated the directorship for the purpose of impressing upon small dealers the necessity of friendly, fraternal and ethical intercourse; that the small dealers were persuaded not to cut prevailing prices or to take customers from each other; that the big dealers sought to drive out small dealers who had the temerity to resist said coercion and compulsion or refused to be bound by the rules prescribed by the accused by preventing them from procuring supplies of coal; and that these acts resulted in inconvenience and delay to consumers in procuring coal and necessitated the payment of a vast sum in excess of what coal would have cost if business had been run in normal channels.

The alleged conspiracy under the act is a misdemeanor, the punishment being imprisonment for not more than one year and a fine not exceeding $5,000.

Mine Foremen Must Not Displace Workers

IDLENESS in northern West Virginia has afforded operators and miners an opportunity to get together and discuss certain disputed matters in regard to working conditions, such discussions having resulted in an agreement being signed about the middle of February denying the right to assign mine foremen to certain duties covered by the scale contract. The agreement was signed on behalf of the Northern West Virginia Coal Operators Association by E. S. McCullough, commissioner of the association, and by Nick Aiello, president of sub-district 4, on behalf of the miners. The agreement in substance is as follows:

Several complaints have been made before the operators' commissioner and the United Mine Workers' officials relative to mine foremen doing work covered by the scale contract. We make the following decision relative to the mine foreman:

"It is in violation of contract for any boss or foreman who is exempted by scale contract from the payment of union dues to work on any job covered by scale contract. This does not prohibit a boss or foreman from assisting any workman in performing emergency work whenever no workman is thereby displaced.

"When a mine is closed down pending a revival of the coal market, the regular workmen must be employed whenever men are needed to keep the mine in repair; this does not, however, prevent companies from combining two or more jobs when the work can be performed without doing an injustice."

Terrorized Willis Branch Men Quit Work

THE trouble at Willis Branch, in the New River field, where the Willis Branch Coal Co. has been endeavoring to run an open-shop mine since September, 1919, despite frequent attacks from union miners and their sympathizers, has become so serious that on Friday, Feb. 25, Governor John J. Cornwell of West Virginia and Governor-elect Morgan made a personal visit to Willis Branch for the purpose of investigating conditions and deciding on the best course to pursue in preventing further trouble.

After the attack on the Willis Branch plant made on Feb. 18 no one was left at the plant, and in order to protect it from utter destruction a squad of state police was assigned to guard it from further attacks. No attempt is being made to operate the mines, as the miners who stuck to their jobs over a period of more than a year have all been driven away by the fury of recent attacks, which reached their climax during the third week of February.

Want Right to Organize Established by Law

MORE than one hundred national and international labor union representatives conferred with American Federation of Labor officials in Washington recently to prepare a program, to combat the open-shop movement and to prevent legislation and other restrictions on labor's right to strike. President Lewis of the United Mine Workers of America said that 100,000 miners had been without work since Jan. 1 of this year and that those working were on a two- or three-day week basis. It is understood that the executive council of the federation has drafted a bill to legalize the right of labor unions to organize all fields of industry despite individual contracts between employers and employees. This bill is framed to meet the decision in the Hitchman Coal & Coke Co. case which held such contracts to be legal.

Come Here to Work and Not to Strike

ALBERT MANKA, formerly an organizer for the United Mine Workers of America, has embarked upon an insurgent movement against the United Mine Workers, his plan being to have the miners of northern West Virginia break away from the United Mine Workers and form a separate organization in West Virginia. He bases his campaign on the fact that the Polish miners did not come to the United States to strike but to work.

Manka is of Polish birth, and as there are a good many miners of that nationality in West Virginia his influence may carry considerable weight. Manka really launched his campaign during the third week of February at Sabraton, in Monongalia County, where he is said to have addressed a large and enthusiastic meeting of miners.

Manka's argument is that inasmuch as the union miners are now allied with the miners of Illinois, Indiana and Ohio in the Central Competitive field, every time there is serious trouble in the Central Competitive field, miners of West Virginia also are called out, although the controversy may be one in which they have no interest. Hence when West Virginia miners are called out they lose time and money.

As an alternative to the international organization Manka favors a state organization and is making his campaign with that end in view. Manka asserts that there is a large sentiment favorable to secession from the parent body.

Plan Strike as School and Borough Taxes Are Deducted from Wages

SINGLE men having pay coming at the Jermyn Coal Co.'s colliery, Old Forge, Pa., had their school and borough taxes deducted on Feb. 28, at the instance of John W. Holland, borough tax collector. Some refused to accept the pay offered, but, on receiving advice, accepted what was tendered. The mine workers knew that it would be the last pay to be received for some time, as the mine was to be closed down indefinitely for lack of orders. The Pennsylvania Coal Co.'s mine in the same borough suspended operations on the same day, Feb. 28. In fact the Jermyn Coal Co.'s plant had been idle for two weeks prior to that date. Many men have been temporarily dismissed from service at the Rushbrook colliery, of the Suffolk Coal Co., in Avoca. Other independent anthracite companies are planning a suspension of operations.

INDIANA COVE COLLIERY, NEAR GLACE BAY, N. S., RESUMES.—Union officials are jubilant over a settlement, said to be much better than the Montreal award, that has been granted to the men of the Indian Cove Colliery, near Glace Bay, N. S. The new wage scale is retroactive to Nov. 1, 1920.

The Weather Vane of Industry

News Notes Chronicling the Trend of Industrial Activities on Which Depends the Immediate and Future Market for Coal

THE general business situation has changed but little during the past month, according to the March bulletin of the National City Bank of New York.

"The industrial situation is mixed," the bulletin continues, "the news from day to day telling of works that are closing and works that are starting up, the one class of reports apparently about balancing the other. The amount of unemployment unquestionably is very large, but the amount of distress reported is comparatively small, indicating that the wage-earners had laid by something in the day of good earnings. The volume of retail trade in the industrial cities supports this view, but trade in the rural districts is light, bank clearings are down 25 to 30 per cent from a year ago, which, however, is not very bad considering the lower prices.

"Railroad tonnage is off about 20 per cent from the high point in October. The number of idle cars approaches 400,000. The movement of coal, grain, oil, lumber and all the chief commodities is light. The export business in coal to Europe is dead for the time being at least, and the domestic coal trade is flat, with a good many mines on part time and keen competition among sellers.

"The general trend of commodity prices has been downward and trade has continued on a hand-to-mouth basis.

"The automobile industry is showing some revival. Wage reductions are numerous and generally accepted as necessary.

"The cotton goods trades have had a fair amount of small business, but have not sustained the expectations that were raised soon after the first of the year, when they started off with a rush.

"The railroad situation is involved in a maze of complications almost as desperate as the state of international relations. There are so many powers to be consulted, so much speechmaking to be done, so much antagonism to be overcome, and such a division of authority that the proceedings are interminable. The railroad companies are trying to get into position where they will be able to exercise some effective authority in the operation of their lines."

Lincoln Motor Co. on Full Time

The Lincoln Motor Co. plant at Detroit was to resume full time operations with an enlarged force Monday, March 7, according to an announcement made March 5 by W. C. Leland, vice-president. The plant had been operating part time.

5,000 Garment Workers Strike

The International Ladies' Garment Workers' Union on March 9 put into effect a general strike in the misses and children's dress industry of New York City. About 5,000 operatives, mostly girls and women, quit 400 shops. The strike was called to unionize the entire industry and establish a minimum wage of $25 a week. The Children's Dress Manufacturers' Association, which had an agreement with the union, recently disbanded, and on the termination of the contract the union charges hours were lengthened and wages cut from $3 to $10 a week.

Form New Automobile Company

Frank L. Klingensmith, recently resigned from the Ford Motor Co.; Frank F. Beall, former vice-president of the Packard Motor Co., and William A. Blackburn, former factory manager of the Cadillac Motor Car Co., announced March 9 that they had organized a new company for the manufacture of automobiles in Detroit. The new concern is to be known as the Gray Motor Corporation, and the manufacture of cars to be sold at about $1,500 will start at once. It is the expectation of the officers that cars will be placed on the market this summer.

18,000 Re-Employed in Detroit

Nearly 18,000 more men were employed in factories in the Detroit area on March 1 than at the beginning of February, according to a survey of the labor situation made public March 4 by the Employers' Association of that city. The number of men now employed by the seventy-nine member corporations was placed at 62,878, a gain of 17,905 during February. This leaves approximately 140,000 idle, the association estimated.

Paper Mill Cuts Force Again

Sixty men in the sulphite department of the Great Northern Paper Co. at Madison, Me., were laid off indefinitely March 7. Others had been laid off the previous week, but part of them are employed in other departments.

P.R.R. Has Dropped 61,000 Men

It has been learned at the Pennsylvania Railroad offices in Philadelphia that since the company began its retrenchment policy last December 61,000 men throughout the system had been laid off up to March 1, reducing the total number of employees from 279,000 to 218,000.

Woolen Mills Resume Operations

The Indian Spring Mill of the American Woolen Company at Madison, Me., which has been idle since May, received orders March 8 to resume operations. It is expected that it will be running at full capacity within three weeks, employing about 300 persons. Starting Monday, Feb. 28, the Thomas Oakes Woolen Mills at Bloomfield, N. J., resumed operations on a forty-eight hours a week basis with a 20 per cent reduction in wages. Since last December the plant had been closed on Saturdays. The decrease in pay was announced early in February, and 300 workers went on strike.

Little Promise in Steel Outlook

Summarizing conditions in the iron and steel industry as of March 10 the *Iron Age* said: "March promises as yet no more business than February, which was a record for dullness with many of the steel companies. Failing to see signs of active buying interest, mills have entered the small amounts of current business at above the minimum levels of late extreme quotations. All the immediate improvement expected will probably be due to increased purchases for urgent consumption seeing that present output, totaling hardly 40 per cent for the industry as a whole, is only two-thirds of what is considered necessary to meet the ordinary wear and tear."

British Decontrol Unsettles Prices

DOMESTIC coal prices are increasing with the termination of government control of the British coal industry. South Wales collieries are advancing house coal 5s. to 1s. 6d. a ton, and it is understood that industrial coal will be similarly raised, excepting smalls, for which a free market has tended to weaken prices in view of large stocks. South Derbyshire collieries also have advanced house coal 5s., reducing smalls 5s. a ton. Miners' advances in wages under the strike agreement of November have practically disappeared owing to the reduced output.

The Coal Merchants' Federation, however, has decided that there shall be no immediate advance in coal anywhere. Twelve thousand tons of seconds Durham gas coke have been sold in New Castle for early shipment to Genoa at £2 5s. c.i.f. This is much below the current f.o.b. equivalent.

Output for the week ended Feb. 12 was placed at 4,345,000 tons, comparing with 4,418,000 tons the week previous and 4,607,000 tons in the week of Jan. 29. Production shows a steady decline since the turn of the year, resulting from the slow demand and poor market.

German Coal Production in 1920

By H. O. Herzog

GERMANY'S coal production figures for December being now available, allow a clear survey of the year's total production. The following table gives the figures of the various coal-producing sections in thousands of metric tons:

	Bituminous Coal	Brown Coal	Coke	Coal Bricks	Brown Coal Bricks
Prussia exclusive of the Saar and Palatinite districts	127,036	91,761	24,865	4,177	19,837
Bavaria	87	2,421	.....	.....	121
Saxony	4,056	7,656	145	.....	1,808
Badenia	.....	.....	.....	669	.....
Hessen	.....	522	.....	82	18
Brunswick	.....	2,756	.....	.....	624
Saxony-Altenburg	.....	5,364	.....	.....	1,715
Anhalt	.....	1,154	.....	.....	158
Other provinces	168	.....	168	11	.....
Total Germany without Saar and Palatinate districts	131,347	111,634	25,177	4,938	24,287

These figures denote considerable progress compared with 1919, and make even quite a good showing in comparison with the production of bituminous coal during war time, as is shown in the following tables:

	Total Germany	Total excluding Alsace-Lorraine, (Saar and Bavarian Palatinate)
	In Thousands of Metric Tons	
1914	161,535	148,523
1915	146,712	134,352
1916	158,847	145,111
1917	167,311	154,409
1918	160,526	148,187
1919	116,681	107,711
1920	131,347	131,347

For comparison the first row of figures of the above table gives the output of the German state including the territories disannexed by the peace treaty, while in the second row the output of the latter has been deducted. These figures demonstrate the progress in 1920 and the approach to normal conditions.

When making comparison with the production of pre-war years German publications invariably put forward the output of the year 1913. The output of 1920 remains far behind that of 1913, but the latter year represents the highest German coal production on record, and gives by no means a fair standard. In fact production in 1920 does not fall so very short of pre-war production, when looking back beyond 1913. Production in the years from 1908 to 1913, inclusive of the contribution of the now disannexed districts, was as follows in metric tons: 1908, 146,093,000; 1909, 146,964,000; 1910, 151,073,000; 1911, 158,581,000; 1912, 174,875,000; 1913, 191,511,000. The contribution of the disannexed districts averaged 8 per cent of the total output, which should be deducted when considering the past output, of the mines of present Germany only.

From these figures it appears that production now stands approximately where it was in 1909 and even 1910.

The increase in production is due to improvement of mine equipment, which, although carried out on a small scale, has made itself felt in such a way that in some mines the best record figures have already been reached; also to an increase in the number of miners, and mainly to the so-called overtime shifts or extension of regular working time from seven to eight or eight and one-half hours, which has come into force since March, 1919, although results were delayed by the political riots of that month. How far the larger number of miners is responsible for increased production becomes apparent in the following figures relating to the Rhenish-Westphalian district:

1920 Month	Output per Day, Metric Tons	Number of Work Days	Number of Miners Employed	Production per Man and Shift
January	264,875	25¼	475,747	0.591
February	286,511	24	479,252	0.613
March	236,951	27	481,274	0.581
April	271,314	24	474,202	0.580
May	305,053	23¼	479,080	0.593
June	304,272	24½	484,410	0.591
July	280,154	27	491,106	0.577
August	287,879	26	502,526	0.574
September	300,042	26	511,274	0.578
October	312,199	26	519,685	0.607
November	331,205	24½	527,348	0.628
December	377,279	24⅛	532,798	0.720

A report which just comes from Upper Silesia clearly shows the importance of these overtime shifts. In one-half month after coming into operation in Upper Silesia the daily output has been raised considerably. It was 120,887 tons on Jan. 15, while the daily average previous to Jan. 1 was only 112,000 tons.

The most adverse condition is the general deficiency of transportation. The Ruhr district alone reports for December a shortage of 122,000 trucks. The stores of coal at pit mouths in the district increased from 490,000 tons to 882,000 tons in December, compelling several mines to reduce shifts.

While coal production has improved, it is still below the average of previous years; but brown coal production has reached unparalleled figures. Last year's production of brown coal by far exceeds the output of any preceding year. In view of the preparations which have been made throughout the country for more intensive production of brown coal, a considerable advance may be expected during the coming year.

Shanghai and Japanese Markets Are Dull

OWING to the approach of the China New Year—Feb. 8—trading in Japanese coal at Shanghai was very quiet during the fortnight covered by Wheelock & Co.'s coal market report, dated Jan. 27. Native dealers were not inclined to enter into any new business, but an early revival was predicted after the holidays. In Japan the market was dull and prices easier. Fushun and Kaiping coals are unchanged.

Fu Chung coal mines, located in the Province of Honan, produce anthracite which has been very well-known for a number of years, particularly at Hankow, where the Fu Chung Corp. has extensive facilities for handling coal for export.

Coal prices are quoted as follows:

	Taels per Ton ex Wharf
JAPAN COAL	
Miike lump, Miike small, Miike dust	Contracted for
Kishima lump	16.00
Shakano lump	15.00
Arate lump	14.00
Shimoyamada Kirigomi	13.00
Shin Shakano Kirigomi	13.00
Yoshinotani No. 1 lump	14.00
Yoshinotani No. 2 lump	12.00
Ochi lump	14.50
KAIPING COAL	
No. 1 lump	Contracted for
No. 2 lump	13.50
Washed nuts	13.50
Washed slack	10.50
No. 1 slack	9.00
No. 2 slack	8.50
FUSHUN COAL	
Dust	11.00
Kirigomi	No stock
Lump	No stock
FU CHUNG (ANTHRACITE) COAL	
Nos. 1, 2 and 3 Cobbles	14.00
Boiler coal	13.50
Dust coal	9.50

National Construction Conference Advises Drastic Deflation of Prices and Wages

FRANKLY stating that public distrust of the construction industries is the cause of the present stagnation in building, the National Construction Conference at Chicago, on March 2 and 3, advised "drastic deflation of prices and wages to an irreducible minimum." While each charged responsibility for inaction to the others, labor, management, capital and transportation all agreed on this main fact. Organized labor, it is to be particularly noted, was as prompt in accepting its duty in readjustment as were capital and management. With the decision that deflation is necessary, the conference recommended that local conferences be held to state the problem and arrive at means for concerted action and that individual industries review and revise their prices to effect complete deflation at the earliest possible moment.

Striking the keynote of the conference with the statement that no remedy was possible unless all interests approached the situation with a determination to sacrifice something, Harry A. Wheeler, vice-president of the Union Trust Co., Chicago, announced that "It is obvious that cheaper money is essential to the start of building operations." If it may be expected that labor, materials, transportation and money will recede no further, then this is the time to begin to build, and to convince the public that such is the case. If, on the other hand, we may expect that these commodities will be cheaper, every effort must now be made to arrive at that stage of an "irreducible price level" when reconstruction may start.

Rediscount rates, expressing the financial remedy to the building trade, Mr. Wheeler said, are the main obstacles facing the construction business. "If rediscount rates were lowered today, current money rates would fall within forty-eight hours. From our viewpoint, that is the biggest item now obstructing the financing of building projects. If the Federal Reserve system will lower its rediscount rate, in conformity with the rate now prevalent in a number of commodities, the banks will immediately lower their interest rates on money."

Railways Unable to Reduce Rates

C. H. Markham, president of the Illinois Central R.R., spoke on the transportation problem as it affects the construction industry, urging builders to co-operate with the railroads in furthering liquidation. He was supported by A. J. County, vice-president of the Pennsylvania R.R., who stated that there will be no increases in rates despite the frequent deficits, but on the other hand there can be no decrease for some time to come. Mr. County stated that the "railroads have made a serious deflation in their outlays and costs, and are looking to the other trades and industries to help in making a basis on which business can resume." High costs and profits must be deflated to meet present conditions. Industries can get close to their customers with prices for raw materials and finished work that will influence them to enter the market. "We must also look for the government to assist this deflation program by definite steps: (1) The fixing of war indemnities and the funding of the war debts and costs of the various nations, as well as our own, so that the same may be spread over a fifty-year period. (2) Reduction to a peace basis of governmental staffs and bureaus—federal, state and municipal—to bring about a reduction in heavy taxes."

The government, he asserted, must join in a program of cutting off large expenditures for non-productive work, and those that will not reduce expenses and finish only those projects so far advanced that it will mean a waste of capital to stop the work.

High Prices Control—Not High Wages

Speaking for organized labor, James Bulger, president of the Denver Trades Division of the national federation, said: "Everyone who has taken part in this conference has taken a keen pleasure in 'passing the buck.' The railways have laid the trouble to labor and rates. The banks, as represented here, mention rediscount rates as the trouble and labor. Coal representatives who have spoken at this conference have stated that 80 per cent of the cost of coal is due to labor. Construction men have plainly intimated that housing operations would start just as soon as labor reduced its wages. Labor may be somewhat at fault—that may be said of a number of things pertinent to the construction industry—but, deeper than that, it is indisputable that the real obstacle in the way of commencing building operations, and one of the principal causes of unemployment—is the high price of building materials."

Summarized briefly the conference disclosed that current costs of construction materials still remain much and erratically higher as compared with pre-war costs and compared with the average of all other commodities. Current construction labor costs have not had proper adjustment to accord with present conditions. Practices and conditions surrounding the financing of building construction require modification. Relations between employers and employees call for improvement and stabilization to effect continuity of operations in all building construction, and employers and contractors have not progressed to the needed extent in effecting reasonably prompt deflation of values throughout the construction industry (and all stages thereof from raw materials to finished products), including their own overhead and profit.

The conference was held under the direction of the National Federation of Construction Industries, Ernest T. Trigg, Philadelphia, Pa., president.

Seven Lives Believed Lost in Worst Mine Fire in History of Illinois

THE Kathleen mine at Dowell, Ill., operated by the Union Colliery Co., of St. Louis and Chicago, has been closed down and both of the large shafts of the mine have been sealed up. Wednesday morning, Feb. 23, at about 10:30, a small fire was discovered in one of the main entries of the mine about 3,000 feet from the shaft bottom. The fire while small when discovered, was evidently burning very rapidly and all of the men working in the mine were immediately notified to leave for the surface. In some manner, seven men, most of them tracklayers, who were working behind where the fire was, became trapped in such a way that it was impossible for them to escape through any of the back entries or crosscuts.

All efforts were then turned toward rescuing the men. Mine-rescue teams from Du Quoin, Benton, Elkville, Hallidayboro and other neighboring towns were called on, and after thirteen hours of desperate fighting it was pronounced by company and state mine officials impossible to put out the fire with any known fire apparatus. As it also was impossible to rescue the men while the fire was raging, the order was given and sanctioned by state mining officials to seal both shafts of the mine. The work of sealing the two holes started at 2 o'clock the morning after the fire, the fan having been stopped, and the job was completed about one hour after daylight.

This is said to be the worst mine fire in the history of Illinois and it also happens to be in one of the newest, largest and most up-to-date mines in the state.

The day following the fire, many state mining experts from Springfield, including Robert M. Medill, State Director of Mines and Minerals of Illinois, and also a body of mining engineers and students from the University of Illinois, arrived at the scene. At their suggestion, a churn drill was moved over the entry where the men were entrapped and the work of drilling into the entry was commenced, in the hope that the men might have possibly sealed themselves from the fire with material which was known to have been in the entry. After drilling for four and one-half days, however, the hole punctured the entry, but instead of any signs or taps being heard on the casing of the hole only

hot and death dealing fumes came from the hole, verifying the general opinion that the men had died a few hours after the fire had started.

The mine will be closed from thirty to ninety days, depending largely upon the success of smothering the flames. In the meanwhile the mining and University of Illinois engineers will make experiments as to the conditions of the fire and the various gases emitted. The mine was equipped with mining machinery and safety devices costing nearly $1,000,000.

To Hold Hearing March 24 on Proposed Changes in Anthracite Rates

IN compliance with requests from carriers the Coal and Coke Committee of Trunk Line Territory announces a hearing March 24, 1921, at 10:15 a.m., room 401, 143 Liberty Street, New York City, on a proposal to restore substantial parity of rates on anthracite coal as between shippers, consignees, destinations and routes from anthracite fields in Pennsylvania to points on the New York Central R.R., West Shore R.R., New York, Ontario and Western Ry., Erie R.R., Lehigh Valley R.R., Delaware, Lackawanna & Western R.R., Delaware & Hudson Co., Cooperstown & Charlotte Valley R.R., Boston & Maine R.R. (Saratoga Springs, N. Y.), Buffalo, Rochester & Pittsburgh Ry., Central New York Southern R.R., Pittsburgh, Shawmut & Northern R.R., Unadilla Valley R.R., Cortland County Traction Co. and Pennsylvania R.R.

Washington Reverts to Wage of 1919

DATING from yesterday, March 16, the coal industry in the State of Washington has reverted to the scale existing Oct. 31, 1919. This, according to the formal statement issued March 1 by an operators' committee representing 90 per cent of the state's commercial coal production, means that an average reduction of 23 per cent will be made both to mine workers and consumers. To compensate the various classes of labor employed, the statement says, living costs to labor at the mines will be correspondingly reduced.

The operators before making the reductions sent a personal statement to each employee explaining what had made the move necessary. They added that these changes would doubtless be opposed by officials of the United Mine Workers of America, District No. 10, but they believe the employees would see the justice of the employers' position and demand such action by the union as would permit the mines to operate. Should the operators' action be rejected by the mine workers, it was announced, the mines would close March 16, to remain shut until action by the men permitted their reopening.

It is asserted that the operators' announcement means a cut in the price of coal to the consumer of from $1 to $2.50 per ton.

Employees will be affected as follows: Miners actually digging the coal, who have averaged $10 a day, will not average more than $8.50; timbermen, track layers and other semi-skilled men working under ground, who now make $8.25 a day, will be paid $5.89 a day; common laborers employed under ground, who now make $7.55 a day, will receive $5.20; semi-skilled men employed above ground, who now make $8 a day, will be paid $5.75 a day; common laborers working above ground, who now receive $7 a day, will get $4.65 a day.

Even with these reductions, the operators pointed out, the common laborers working under ground and above ground at the coal mines will receive a much higher wage than now is being paid the same class of labor by lumber camps. The latter wage, according to the coal operators, averages from $3.20 to $3.60 a day. As compensation to the labor classes, so that they may maintain the same relation between the new wage scale and the cost of living as it existed on Oct. 31, 1919, the mines will reduce the cost of room and board from the present figures, which range between $40 and $47 a month, to between $30 and $37.

Some of the coal-price reductions to consumers will not run more than 50c. a ton, but domestic coals will decrease in price as much as $2.50 a ton. Normally 5,000 workers are employed by the coal industry of the state. Of these it is estimated 3,500 are now working. Twenty per cent of the mines, however, are now shut down and the balance operate only two to three days a week.

The notice mailed to all coal-mine employees by the operators is signed by the Wilkeson Coal & Coke Co., Roslyn Cascade Coal Co., Carbon Hill Coal Co., Fairfax Mine, Inc., Denny-Renton Clay & Coal Co., Carbon Coal & Clay Co., Cumberland Coal Mining Co., Ozark Coal Mining Co., Central Coal Co., Columbia Collieries, Durham Colliery Co., Roslyn Fuel Co., Independent Coal & Coke Co., Pacific Coast Coal Co., Mendotta Coal & Coke Co. and the Fords Prairie Coal Co.

Bureau of Mines Will Sample and Test Coals Shipped Through Tidewater Exchange

A CO-OPERATIVE agreement has been entered into by the U. S. Bureau of Mines and the Tidewater Coal Exchange, Inc., for the purpose of sampling and testing coals shipped through the exchange and assisting in classification of the mines. The contract follows:

"Whereas the Tidewater Coal Exchange, Inc., desires to classify coal on a basis of accurate sampling and analyses and to establish limits and tolerance of quality for certain pools and to maintain the quality of the pools within the limits specified, and

"Whereas the Bureau of Mines desires to obtain and disseminate accurate information concerning the preparation of coal with a view to increasing efficiency and conserving resources:

"Therefore, the Bureau of Mines and the Tidewater Coal Exchange, Inc., agree to co-operate to realize the mutually desired ends, as follows:

"The Bureau of Mines agrees to direct the work of obtaining the necessary technical information required, using its standard methods and equipment and furnishing certified reports of each finding. The work contemplates the collection and analysis of representative samples of coal as shipped and of mine samples when necessary. All analyses will be made at the bureau's Pittsburgh station.

"The bureau will give such aid as it can in helping the Tidewater Coal Exchange, Inc., to establish limits and tolerances based on analysis for each pool and in disseminating information as to such standards when finally determined. The bureau will aid in developing the necessary equipment and facilities for taking samples, and it is mutually agreed that in the process of taking samples, either at the mines, the piers or elsewhere, such sampling will be done in a manner that will not interfere with the railroad operation. The bureau will hire all the men mutually agreed upon as necessary to do the work, and certify all vouchers to the Tidewater Coal Exchange, Inc. The bureau's responsibility shall not extend beyond the facilities provided by the Tidewater Coal Exchange, Inc., to meet these responsibilities.

"The Tidewater Coal Exchange, Inc., agrees to make classifications on the basis of the analysis furnished by the bureau and publish the same, and to assign coal to pools within the limits and tolerances as finally published.

"The Tidewater Coal Exchange, Inc., agrees to pay all expenses incurred in work mutually agreed to in writing and by vouchers certified by the Bureau of Mines.

"The Tidewater Coal Exchange, Inc., agrees to obtain permission from mine operators shipping coal to ports for Bureau of Mines engineers to have free access to mines when necessary for the purpose of taking mine samples and to furnish labor as may be needed and reasonable facilities for reducing gross samples.

"The Tidewater Coal Exchange, Inc., agrees to furnish facilities and equipment where needed to carry out the expressed intent of this agreement and to use the name and connection of the Bureau of Mines in no way other than as agreed to in writing by the Director of the Bureau.

"This agreement is to terminate June 30, 1921, unless renewed, or the agreement may be terminated on sixty days' notice by either party.

Navy Opens Bids for Coal Requirements for Next Year; Repeal of Lever Act Ends Commandeering

ON March 8 the Navy Department opened bids for its coal supply for the next year, receiving a large number of proposals for both anthracite and bituminous coal for shore and ships' use. The bids in most instances were in great detail, covering various quantities, deliveries at various places and for various periods. It is reported that the bids were regarded as reasonable both as regards the mine and point of delivery quotations. As Congress has repealed the Lever Food and Fuel Law, under which the navy has commandeered coal since 1917, the department will be required to accept all or part of the bids, or readvertise.

The bids on some of the larger items at tidewater are as follows, those for the period April 1 to June 30, 1921, being indicated by the prefix (1), those for period April 1 to Sept. 30, 1921, by the prefix (2), and those for the coal year April 1, 1921, to March 31, 1922, by the prefix (3):

Whitely & Foedisch, Phila., bid $7.24 on 1 and 2 and $7.29 on 3, for 76,500 gross tons of steaming coal for the Brooklyn Navy Yard (class 1031).

On class 1033, which is for 25,000 gross tons of steaming coal for the Philadelphia Navy yard, the Emmons Coal Mining Co., Philadelphia, bid $7.18; Quemahoning Coal Co., Somerset, Pa., bid $6.68, and Thorne, Neale & Co., Philadelphia, bid $6.87 for delivery f.o.b. vessels under chutes at piers. All three bids are for the entire coal year. On the same requirements, but for delivery f.o.b. hopper-bottom cars at mines, the Davis Coal & Coke Co., Baltimore, bid (2) $3.83, (3) $3.98; Emmons Coal Mining Co., Philadelphia, (3) $4.20; Imperial Coal Corporation, New York City, (2) $3.92, (3) $4.20; Quemahoning Coal Co., Somerset, Pa., (3) $4.05; The J. Tatnall Lea & Co., Philadelphia, (3) $3.90; Thorne, Neale & Co., (3) $4.18; Weston-Dodson Co., Inc., Bethlehem, Pa., (3) $4.46.

On bid on class 1035, which is for 100,000 gross tons steaming coal for delivery f.o.b. vessels, under chutes at piers at Baltimore, was received from the White Oak Coal Co., Macdonald, Fayette County, W. Va., (3) $4.48. On the same item, but for delivery f.o.b. hopper-bottom cars at mines the Davis Coal and Coke Co., Baltimore, bid (2) $3.83; and H. P. Brydon & Bros., Inc., Piedmont, W. Va., bid (1), (2) and (3) $4.48.

For 50,000 gross tons of coal for use at the naval base at Hampton Roads (class 1041) bids for delivery f.o.b. hopper bottom cars at mines, were received from the S. J. Patterson Co., Dayton, Ohio, (1), (2) and (3) $4.50, 25,000 tons; Reid Coal Mining Co., New York City, (3) $1.74; Flat-Top Fuel Co., Inc., Bluefield, W. Va., (1) $3.70, (2) $3.80, (3) $3.90; L. A. Snead Co., Washington, D. C., (3) $3.92.

The largest requirement in the proposal is for 915,000 gross tons of steaming (bunker) coal, Hampton Roads, class 1042. Bids on this item for delivery f.o.b. vessels at piers were received from William C. Atwater & Co., Inc., New York, (3) $6.70, 240,000 tons; Crozer-Pocohantas Co., Philadelphia, (3) $6.75 for 200,000 tons, alternate $6.50; Reid Coal Mining Co., New York, (3) $6.49; Dexter & Carpenter, Inc., New York, (1) $6.50, (2) $6.75, (3) $7.10, 15,000 tons monthly; The C. G. Blake Co., Cincinnati, Ohio, (3) $4.48; Pocohantas Fuel Co., New York, (3) $6.75 for 450,000 tons; White Oak Coal Co., Macdonald, Fayette Co., W. Va., (3) $7.28 for 90,000 tons; Weston-Dodson Co., Bethlehem, Pa., (3) 100,000 tons $7.35, 100,000 tons $7.58, and 100,000 tons $7.83.

For storage, for which about 300,000 tons are expected to be required, delivery to be either into storage or at mines, as indicated, the following bids were received: Reid Coal Mining Co., New York, (3) $6.49 (storage); Fayette Smokeless Fuel Co., Mount Hope, W. Va., $4 (mines), (3) $4.35 (mines), and $7.15 (storage); C. G. Blake Co., Cincinnati, (1) $3.36, 240,000 tons (mines); Leckie Coal Co., Inc., Columbus, Ohio, (3) $4.50, 50,000 tons (mines).

Another Coal Crisis on the Way*

BY SAMUEL DUNN
Editor, *Railway Age*

IF PRESENT TENDENCIES in the production and transportation of coal are not speedily changed the American people within a few months will be confronted with the most serious danger of a coal famine ever known. The production and transportation of bituminous coal have been rapidly declining, and within recent weeks have reached the lowest levels for years, except during the coal strike in November and December, 1919.

It is but two months since the week ended Dec. 11, when the mines produced and the railroads transported 12,865,000 tons of bituminous coal. They are now producing and transporting only 7,300,000 tons weekly, a decline of 43 per cent. It is but a few months since the railways were being generally denounced because they could not haul all the coal the country needed. Today 175,000 coal cars are standing idle because consumers and dealers are not buying and the mines are not producing coal with which to load them.

The situation demands the immediate attention of coal consumers, dealers and operators, railway officers and the Interstate Commerce Commission. There has been a plethora of propaganda in the past because the railroads could not handle enough coal when people wanted it. There is need to make all concerned understand now that if the railways are not soon given opportunity to haul more coal, the coal situation developing will be far more acute than any previously experienced.

The only time within recent years, except during the miners' strike, when the production and transportation of coal were anywhere near so small as they are now was early in 1919. The situation now, however, is much more threatening than then. Not only is less coal being produced than then, but the country entered the year 1919 with a storage supply of about 58,000,000 tons, the largest amount ever on hand at the beginning of a year, while it entered the year 1921 with comparatively small storage supplies.

The production of coal continued to be small throughout the first half of 1919. Everybody knows the sequel. The storage supplies were almost exhausted. Business suddenly revived, and with it the demand for coal. The railways were unable to transport it as fast as it was wanted and could be produced, and a howl went up all over the country that there was danger of a coal famine and that the railroads were to blame. In November, 1919, came the strike in the coal mines, which was followed by a coal shortage of several months' duration, due not only to the strike but to the small production in the early part of 1919. The railways throughout 1920 had to make herculean exertions to get enough coal to the Northwest to keep it from freezing and enough to New England and other parts of the country to keep their industries going. Priority had to be given to the use of open-top cars for the transportation of coal, with the result that many business activities, especially building and highway construction, had to be practically stopped.

We are moving toward a repetition of this experience, but in a more serious form and with more serious consequences. The annual average consumption of coal in this

*Editorial in *Railway Age*, March 11, 1921.

country for four years has been 535,000,000 tons, or more than 10,000,000 tons a week. The reduction of consumption owing to mild weather and industrial depression has been large, but far from sufficient to justify a reduction of production to 7,300,000 tons a week.

The main reason for this reduction, as shown by the reports of the U. S. Geological Survey, is "no market." Consumers and dealers won't buy. Probably the main reason they won't buy is the present prices. They are lower than those of a few months ago, but still high. The main reason they stay so high is the excessive wages being paid to the miners. In the two years March 31, 1918, to March 31, 1920, the mine workers in the Central Competitive Field were given five advances. This field embraces Pennsylvania, Ohio, Illinois, Indiana and the Southwest, and has set the pace for the country. Repeatedly wage scales were made to remain in effect for specified periods and advances granted before these periods had expired because the mine workers refused to abide by their contracts.

The advance in the daily wage rate between 1918 and 1920 was from $3.00 to $7.50, or 150 per cent. Many consumers and dealers are not buying because they expect coal prices to be further reduced and believe they should be. Because of this buyers' strike, hundreds of thousands of miners are unemployed, a large part of all the coal cars are idle, and the country is drifting toward a serious crisis.

The present wage scale was adopted to stay in effect until April 1, 1922. Since the miners in the past have repeatedly demanded and secured advances in wages before contract periods have expired, there is no reason why the mine operators should not demand and secure a reduction of wages before the present contract period expires. The entire industry of the country is suffering from the present prices of coal. This is especially true of the railroads. They consume one-third of all the coal produced. Their fuel bills now amount to about $750,000,000 a year. One of the principal reasons for their present high operating expenses is the excessive cost of coal. The question whether there is to be any reduction of miners' wages and consequent further reduction of the price of coal this year should be settled as soon as possible so as to reduce the length of the buyers' strike.

In every year for four years the transportation and business of the country have been demoralized by demands that the railroads should in certain periods to prevent a coal shortage handle more coal than they are physically capable of handling. The railroads and the Interstate Commerce Commission should definitely announce at an early date in terms leaving no possibility of misunderstanding, that no priority will be given to coal this year, no matter what may become the alleged necessities of coal producers and consumers, or of those of any section. The railroads can transport all the coal the country needs if given opportunity to handle it in reasonably uniform volume, and if the stupidity and selfishness of the coal producers, dealers and consumers which have caused one coal crisis after another cause another this year, their stupidity and selfishness should be allowed to produce their natural results. The railroads should cease to be made the "goat" for these coal crises.

Meantime, where are the construction concerns who made such a howl last summer when, owing to priority being given to coal, they could not get enough cars to ship materials? Why are not they "shipping early" in some of the 175,000 open-top cars now standing idle? A few months ago when the railways were moving the largest volume of freight ever handled, many people were charging they had "broken down" because they did not move more. Now, when over one-third of the railroad capacity of the country is idle, many people are saying private operation has "broken down" because with this enormously reduced traffic the railways are facing a financial crisis. The most varied and bitter experience does not seem to teach the American people anything regarding transportation matters.

PRICES OF COAL supplied to steamships at the Panama Canal were reduced $3 per ton on March 1, according to an announcement made by the Governor of the Panama Canal. The reduction will make the price of bunker coal $15 per ton at Cristobal and $17 at Balboa.

Connellsville Coke Concern Cuts Wages

W. J. RAINEY Co., Inc., has reduced wages 18 per cent, the reduction becoming effective March 8 and applying to all classes of mine and coke-yard labor. This company, like all the Connellsville concerns, has no contract with the union. It is considered the largest independent coke-producing company in the region.

The action of the Rainey interests is considered of more than usual importance because it marks one of the rare occasions in the history of the region when an independent operator has taken the initative in revising the wage scale. The H. C. Frick Coke Co., fuel subsidiary of the United States Steel corporation, has in the past set the pace for wages paid, but that company still has in effect the wage scale of September, 1920.

Twenty-five hundred men are affected by the Rainey reduction. The company operates ten plants in the Connellsville region, all of which have been working at approximately 95 per cent of their capacity. Other independent operators have virtually suspended operations and the Frick company is operating upon a 60 per cent basis.

The general opinion prevalent is that the remaining independent operators will wait for action by the Frick company before putting a new wage scale into effect. A comparison of the principal items of the new Rainey scale with the Frick scale now generally in force follows:

	Rainey	Frick
Mining and loading room and rib coal, 100 bu.	$2.66	$3.24
Mining and loading heading coal, 100 bu.	2.91	3.56
Mining and loading wet coal, 100 bu. (miners to drill holes and furnish own powder)	3.15	3.85
Loading machine coal, per 100 bu.	1.80	3.85
Drawing coke per oven charged 72 hr.	2.19	....
Drawing coke per oven charged 48 hr.	2.08	....
Drivers, rope riders, etc., shafts	6.25	7.55
Drivers, rope riders, etc., drift	6.20	7.50
Mine labor, 8 hours	5.25	6.55
Outside labor, 9 hours	4.40	5.40
Leveling ovens, hand	.25	.31

Coal Industry in Peril as Winslow Bill Hung Fire; Seeks Safeguard for Future

NOW that the danger is past, coal operators admit that the solvency of practically the entire industry was threatened at the time the Winslow bill became a law. At that time, it is estimated, the coal producers of the country were carrying on their books more than $125,000,000 worth of railroad accounts. Had the railroads not been permitted to receive partial payments of the government's indebtedness, the coal industry would have been overtaken by the most serious financial difficulty of its history.

As it is, the accounts are being liquidated slowly. The fact, however, that the Winslow bill is on the statute books and the certainty that these overdue accounts will be met as soon as the rather cumbersome procedure is gone through with has reassured the banks, and the situation is comparatively easy. Some individual companies have lost their profit as a result of delays in payment for railroad fuel.

There is much concern in the industry as to the possibility of a similar situation arising in the future. The railroads apparently are having the greatest difficult in meeting their expenses. The partial payments from the government may afford only temporary relief. There is a general demand that some safeguard be provided which will relieve the coal industry of the necessity of financing in part the railroads of the country.

Shipping Board Rejects Latest Bids

WHILE regarding some of the coal bids received Feb. 28 as satisfactory, Chairman Benson of the Shipping Board decided March 14 to reject all the bids in order that the new Shipping Board to be appointed by President Harding might pass on the bids. New bids probably will not be called for until the new board takes office. The decision to reject the bids was reached in order that bidders might be relieved of uncertainty and given opportunity to make other disposition of coal being held for the board. This is the third series of bids to be received and rejected by the board, the first having been received in December, the second in January and the third in February.

Standardizing the Pools of the Sewalls Point Exchange

By J. S. Burrows*

EVER since the beginning of the tidewater coal pools as a war measure there has been much dissatisfaction with the classification of mines and the grading of shipments to these pools. This has been due entirely to the lack of a fixed standard classification and grading system which left out the personal element and which would be as comprehensible to the producer and consumer of coal as to the officials of the exchanges who classified the mines and graded the shipments.

That the personal element entered largely into the matter may be seen from the fact that mines were classified and shipments graded in accordance with the judgment of a few men whose personal experience and knowledge of coal was their only criterion. Such a basis of classification is only one man's opinion against another's, and in cases where the exchanges and their shippers disagreed on the grading of coal there has been no basis for settling the dispute because there have been no definite standards for the various pools and no basis of comparing one shipment with another except by visual inspection.

Shippers of coal over the Virginian Ry., which serves the New River smokeless coal field and has its loading piers at Sewalls Point, Va., on Hampton Roads, determined to correct this situation with respect to their own coal in organizing the Sewalls Point Coal Exchange.

The question of classification and grading of shipments was given first consideration in the organization meeting of the shippers, and it was decided to attempt, under my direction, a scientific basis of classification, in which a known standard would be established for each pool. The basis of classification was to be adopted only after an examination had been made of every mine shipping to the exchange and of a representative sample of a full day's loading taken at each tipple for analysis and test. The co-operation of the U. S. Bureau of Mines was obtained in this work in order that the results would be authoritative. All samples were obtained and analyses made by the trained samplers and chemists of this government bureau.

Operators Insist on Classification by Merit

It is of interest at this time, when quality is re-asserting itself in all industry, to remark the foresight of the group of coal operators who, nine months ago, in the face of an unprecedented demand and high prices, required that regardless of individual consequences, their coal be classified on its merits as determined by test. It has taken all of eight months to complete the preliminary investigation in the field and set up a system of classification and grading based on actual tests.

The new system became effective beginning with shipments to Sewalls Point on March 15, and embraces a definite specification of quality for each pool. Each pool has a standard analysis, a limit of variation, and the buyer is assured coal of this standard quality by certificate of the exchange.

The following new rules of the exchange explain the procedure of classifying the mines:

Only mines which have a car allotment from the Virginian Ry. and which have loading tipples located on their private sidings shall be classified. Wagon mines or other coal mining operations of a temporary character shall not be classified.

New mining operations of a permanent character which are on a development basis will be considered for classification only after a loading tipple has been provided and coal is being loaded direct from mine to railroad car in usual manner.

All mines entitled to classification in the exchange shall be subjected to a standardization test before being classified, and the results of such test shall determine to which pool shipments shall be made.

A standardization test shall consist of a proximate chemical analysis, calorimeter determination and fusing temperature of the ash as made by the U. S. Bureau of Mines or in conformity with the latest methods and apparatus employed in its coal laboratory. Such an analysis and tests to be made of a representative sample of a day's loading at the tipple collected from the run of mine by a coal sampler employed by the exchange, who shall follow the exchange's coal sampling routine, which is made a part of these rules, and who shall submit a report embracing a record of the sample together with his observations as to the grade or size, character or appearance, nature of impurities and preparation of the product. An equal and representative half of the sample shall be furnished to the mine management if desired and the sampler shall ask its representative whether the management is satisfied that the sample taken is representative of the day's loading.

As a result of the standardization test, a copy of which shall be furnished to the mine, the exchange and the mine management shall agree on a standard of preparation in terms of ash in dry coal within the pool limit indicated by the test and the management shall agree to use its best efforts to maintain the standard of preparation decided upon.

Additional standardization tests may be made by the exchange as often as in its opinion changed conditions at the mines require, and any dissatisfaction with the classification may be appealed to the Board of Directors.

Having determined the status of each mine by the standardization test, which gives the mine the opportunity to demonstrate under known conditions the quality of its product (and really classify itself), the next step in the Sewalls Point system is the check on the day-to-day shipments to the pools. This is the most important part of the whole scheme, on which the exchange is depending for the maintainence of its standards. Heretofore it has been considered impracticable to establish analysis standards on account of the difficulty of getting representative samples of coal from railroad cars by the usual methods where the coal is rapidly discharged, as when being dumped into vessels. Samples of coal to be thoroughly representative must weigh a thousand pounds or more—the more the better—and should come from every part of the car.

Installs Country's Only Coal Sampling Plant

Realizing the importance of getting absolutely accurate samples of shipments to the pools, the exchange installed at Sewalls Point coal pier the first and only coal sampling plant for handling large commercial shipments in the United States. The plant was built after my designs and consists of three units, as follows: The dumper, which is separate from the main dumper of the pier, with its own tracks and connections to the pier; the riffle car of sixty tons capacity, which is self propelled; and the sampling and crusher station.

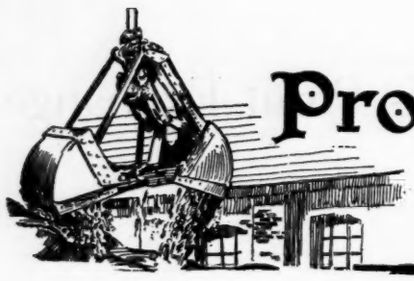
The operation of the plant is as follows: A car of coal to be sampled is run up into the dumper under which the riffle car is standing. The coal from the railroad car is rolled and mixed in passing through the dumper and falls in a wide stream into the riffle car. The body of the riffle car is arranged like a laboratory riffle and the separate compartments cut out a portion of the stream of fifty to sixty tons of the coal flowing in from the dumper.

When loaded the riffle car is run down to the sampling station and ten thousand pounds of coal is discharged from the compartments through a feeder, crusher and bucket elevator, in which it is finally carried to the top of the station, where an automatic device cuts out a portion of the gross sample, which is further reduced to laboratory size as it passes through the plant. The balance of the sample is all returned to the riffle car, which when the sampling is completed proceeds to the top of the pier, discharges and returns to the dumper for the next sample. Daily samples of shipments from the mines form an indisputable record of the quality of the coal being shipped by each mine, and preparation can be controlled and mines reclassified immediately on that record.

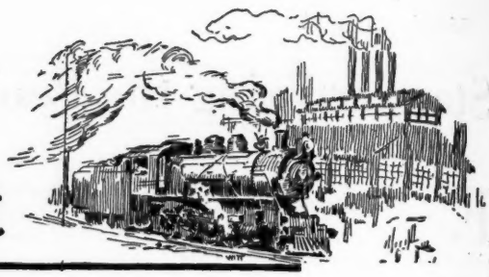
Exchange Conducted for Mutual Protection

In the operation of an exchange the interests of a buyer of coal and of a member of the exchange are identical in so far as quality is concerned. The member who ships a high-grade coal to a pool, for instance, is entitled to and expects to receive from the exchange coal of a grade equal to his own. It is for the mutual protection of both buyers and sellers of coal dealing through the Sewalls Point Coal Exchange, therefore this exchange has established the precedent of making available coal of uniform standardized quality. There is now in preparation a book of specifications and descriptions of the pools, which will be issued by the exchange shortly.

*Consulting engineer, Coal Classification, Sewalls Point Coal Exchange.



Production and the Market



Weekly Review

SO CERTAIN are many producers and shippers of bituminous coal that the industrial consumer, the railroads and the public utilities are inviting trouble for themselves by their continued policy of staying out of the market that these producers and shippers are either indifferent to contract offers or are openly refusing to consider commitments for next year. There is a considerable element in the trade in entire harmony with the editorial of *Railway Age* of March 11 (published elsewhere in this issue of *Coal Age*) entitled "Another Coal Crisis on the Way," who believe that we are due for another period of car shortage and high prices, the beginning of which some predict will be as early as July 1.

A Warning to Industrial Consumers

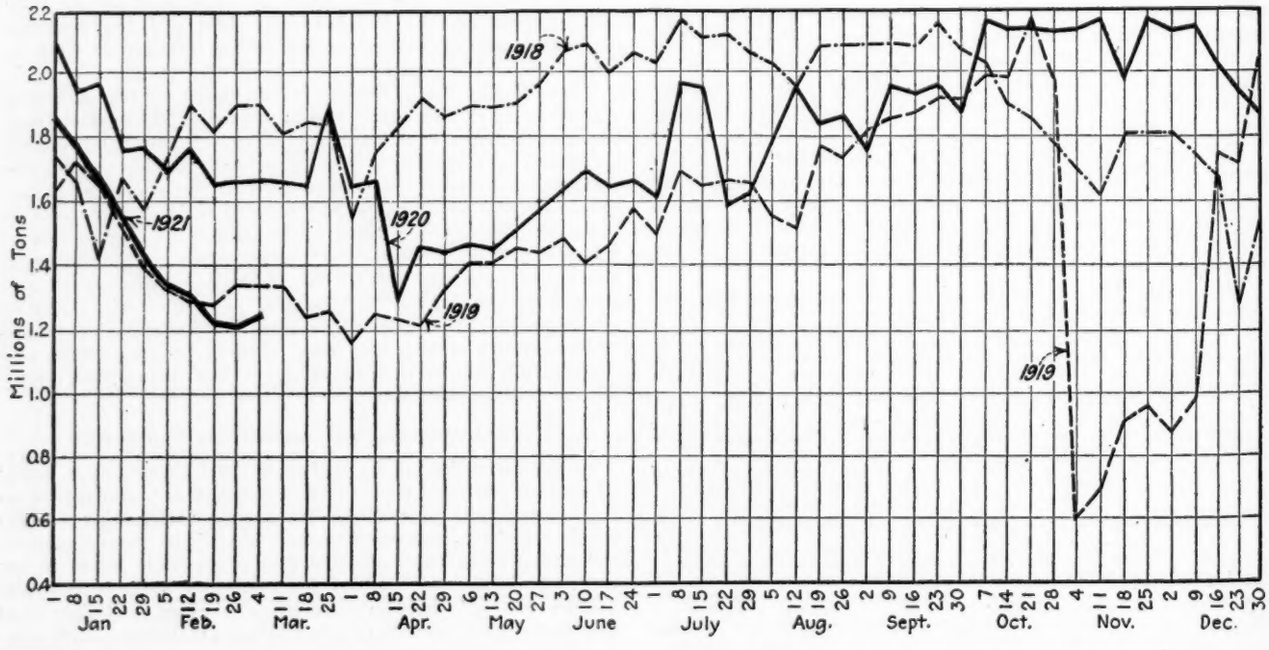
It is up to each individual buyer of industrial coal to appraise his own situation. If he has in prospect the need for a certain amount of coal for the next twelve months he will do well to heed these preliminary warnings and not only protect himself with a contract for a good grade of coal, and at a very reasonable price, but he will make provision for putting the majority of that coal in his stock-pile in the next four or five months. Contracts can be made today with a labor clause covering decrease in wages, and prices for bituminous coal, both for spot and contract, are about as low as can be expected.

The low rate of production and the absence of any spot demand attests the inactivity of all branches of the coal market. Reserves of large consumers are for the most part adequate for present needs, retail trade is quiet because of a continuance of mild temperatures, and overseas demand has temporarily ceased.

Inquiries Made for Contract Quotations

The only bright spots at present are the increasing inquiries for contract quotations and a new condition in the steam market where a slight shortage of screened steam sizes exists. Although but few contracts have actually been closed for the new coal year it is apparent that buyers are measuring their requirements for the next twelve months and are all "getting the range." Buyers' offers for railroad fuel still find few if any takers, but the tonnage involved shows little diminution from amounts covered in normal years. Large users are relying on the spot market currently, but have one eye on the industrial situation, while the other gauges the market. An indication of improvement would doubtless enable them to figure what their requirements may be.

Daily Average Production of Bituminous Coal*



*From weekly report of Geological Survey.

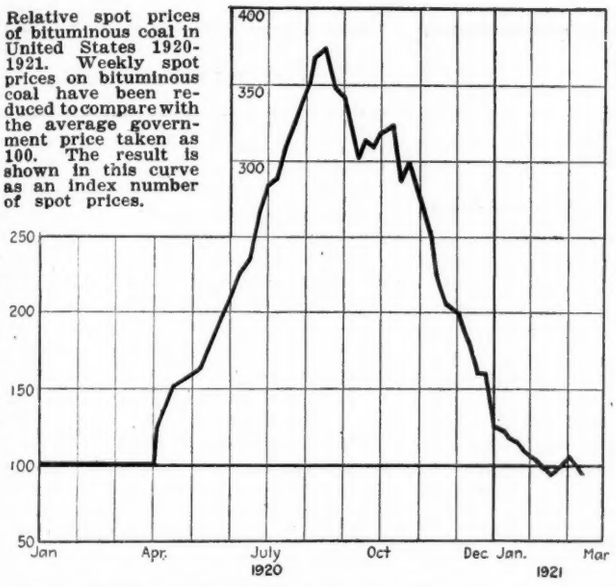
Until that time not many contracts will be closed except where bargains are obtainable.

BITUMINOUS

For the first time since last December the rate of production recovered slightly in the week ended March 5. That this was largely caused by a carryover of business from the short preceding week of Washington's Birthday may be seen from the fact that loadings for the first two days of the next week (March 6-12) declined 1,047 cars. The total output is estimated by the Geological Survey at 7,406,000 net tons, an increase of 160,000 tons compared with the preceding holiday week, but 83,000 tons less than the week ended Feb. 19, the latest full time week.

The heaviest "no-market" losses continue to be found in the Middle Appalachian region. Pocahontas, New River and Winding Gulf fields registered over 60 per cent lost time from this source and the Logan field also was hard hit, 70 per cent operating time being lost. Production in the Northern and Middle Appalachians for the last week in February was 4,162,000 net tons, more than 100,000 tons under the figure for the preceding week.

Relative spot prices of bituminous coal in United States 1920-1921. Weekly spot prices on bituminous coal have been reduced to compare with the average government price taken as 100. The result is shown in this curve as an index number of spot prices.



Rumbles of impending wage readjustments are heard from the coal fields. Reduction of wages in many other lines and the decline in living costs have opened the question of lower mine wages. Interest has been focused on this by the railroads' attempts to lower wages. Trouble has already been experienced in the State of Washington, where 2,000 men are on strike as a protest against a reduction of mine wages.

Spot prices were depressed in the week ended March 15, as shown by the *Coal Age* index, which dropped to 98, a decline of two points from the preceding week. Increasing anxiety of Eastern producers to move coal in the face of an inactive market caused this decline. In the Middle West, spring prices have been announced and the schedule is being well maintained.

Slow opening of the Lakes trade is anticipated, as no ore-carrying charters have yet been made, nor has there been sufficient contracting for Lake coal to guide vessel men in setting rates and completing seasonal arrangements. The question of carrying charges has not yet been taken up.

Tidewater dumping at Hampton Roads piers for the first ten days of March was but 234,000 gross tons; Baltimore some 30,000 tons. The February movement to Tide declined sharply, 2,702,000 net tons being reported by the

Estimates of Production

FROM THE WEEKLY REPORT OF THE GEOLOGICAL SURVEY
(NET TONS)

BITUMINOUS COAL

Total Bituminous, Including Coal Coked

	1921		1920	
	Week	Coal Year to Date	Week	Coal Year to Date (*a*)
Feb. 19(*b*)	7,489,000	483,173,000	9,513,000	427,477,000
Daily average	1,248,000	1,768,000	1,585,000	1,558,000
Feb. 26 (*b*)	7,240,000	490,413,000	10,120,000	437,597,000
Daily average	1,207,000	1,756,000	1,687,000	1,560,000
Mar. 5 (*c*)	7,406,000	497,818,000	10,304,000	447,900,000
Daily average	1,234,000	1,745,000	1,717,000	1,564,000

(*a*) Less 2 days' production during first week in April to equalize number of days covered for the two years. (*b*) Revised from last report. (*c*) Subject to revision.

ANTHRACITE

	1921		1920	
	Week	Coal Year to Date	Week	Coal Year to Date (*a*)
Feb. 19	2,010,000	81,675,000	1,504,000	82,286,000
Feb. 26 (*b*)	1,816,000	83,491,000	1,767,000	84,053,000
Mar. 5 (*c*)	1,917,000	85,408,000	1,604,000	85,657,000

(*a*) Less 2 days' production during first week in April to equalize number of days covered for the two years. (*b*) Revised from last report. (*c*) Subject to revision.

BEEHIVE COKE

Week Ended				
Mar. 5 (*a*) 1921	Feb. 26 (*b*) 1921	Mar. 6 1920	1921 to Date	1920 (*c*) to Date
181,000	193,000	412,000	2,098,000	4,120,000

(*a*) Subject to revision. (*b*) Revised from last report. (*c*) Less 2 days' production during New Year's week to equalize number of days covered for last two years.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F. O. B. Mines

Coal	Market Quoted	Gov't Price	Feb.15 1921	Mar. 8 1921	Mar. 15 1921†
Low-Volatile, Eastern					
Pocahontas mine run	Columbus	$2.35	$3.85	$3.50	$3.50
Pocahontas lump	Columbus	2.60	6.00	5.50	5.50
Pocahontas mine run	Chicago	2.35	2.75	3.75	*$3.50@$3.75*
Pocahontas lump	Chicago	2.60	3.90	5.25	*4.50@ 5.50*
Pocahontas mine run	Boston*	....	6.15	5.75	*5.50@ 5.85*
Pool 1	New York	2.35	3.50	3.25	3.00@ 3.50
Pool 1	Philadelphia	2.35	3.50	....	....
Pool 1	Baltimore	2.35	3.00	3.00	3.00
Clearfields mine run	Boston	2.95	2.60	2.55	*2.00@ 3.00*
Somersets mine run	Boston	2.95	3.15	3.15	*2.40@ 3.60*
Pools 10, 11	New York	2.95	2.50	2.40	**2.15@ 2.75**
Pools 10, 11	Baltimore	2.95	2.50	2.60	*2.25@ 2.75*
Pools 10, 11	Philadelphia	2.95	2.50	2.50	2.25@ 2.75
Pool 9	New York	2.95	2.85	2.80	**2.85@ 3.25**
Pool 9	Philadelphia	2.95	3.00	3.00	**3.25**
Pool 9	Baltimore	2.95	2.80	2.80	**2.75@ 3.00**
High-Volatile, Eastern					
Pittsburgh mine run	Pittsburgh	2.35	2.40	2.35	*2.00@ 2.50*
Pittsburgh sc'd. gas	Pittsburgh	2.35	2.90	2.85	2.75@ 3.00
Kanawha mine run	Columbus	2.70	2.50	2.25	2.25
Kanawha lump	Columbus	2.95	3.90	3.75	*3.50*
Hocking mine run	Columbus	2.50	2.40	2.15	**2.25**
Hocking lump	Columbus	2.75	3.85	3.65	*3.50*
Pitts. No. 8 mine run	Cleveland	2.35	2.50	2.35	*2.00@ 2.25*
Pitts. No. 8 lump	Cleveland	2.60	3.75	3.65	*3.25@ 3.75*

Coal	Market Quoted	Gov't Price	Feb.15 1921	Mar.8 1921	Mar. 15 1921†
Pool 32 (54, 64)	Philadelphia	$2.50	$2.10	$2.35	*$2.00@$2.25*
Pool 34 (54, 64)	New York	2.50	2.15	2.10	2.00@ 2.25
Pool 34 (54, 64)	Baltimore	2.50	2.15	2.15	*2.00*
Midwest					
Franklin, Ill., mine run	Chicago	2.35	2.75	2.65	**2.25@ 3.50**
Franklin, Ill, lump	Chicago	2.55	3.80	3.75	*3.30@ 3.50*
Central Ill., mine run	Chicago	2.35	1.85	1.85	**1.50@ 2.50**
Central Ill., lump	Chicago	2.55	2.60	2.60	*2.00@ 3.00*
Ind. 4th Vein, mine run	Chicago	2.35	2.20	2.60	**2.25@ 3.00**
Ind. 4th Vein, lump	Chicago	2.55	3.30	3.30	**2.75@ 3.50**
Ind. 5th Vein, mine run	Chicago	2.35	2.15	2.40	**2.25@ 2.75**
Ind. 5th Vein, lump	Chicago	2.55	3.10	3.05	*2.25@ 3.25*
Standard mine run	St. Louis	2.35	1.95	1.95	*1.90*
Standard lump	St. Louis	2.55	2.50	2.60	2.50@ 2.75
West Ky., mine run	Louisville	2.35	2.30	2.40	**2.35@ 2.50**
West Ky., lump	Louisville	2.60	3.40	3.15	3.00@ 3.25
South and Southwest					
Big Seam mine run	Birmingham	2.45	3.10	2.95	2.70@ 3.25
Big Seam lump	Birmingham	2.75	3.75	3.75	3.25@ 4.25
S. E. Ky. mine run	Louisville	3.00	2.65	2.75	2.75
S. E. Ky. lump	Louisville	3.25	4.40	3.85	*3.50@ 4.00*
Kansas mine run	Kansas City	3.50	4.50	4.50	4.50
Kansas lump	Kansas City	4.00	5.50	5.50	5.50

*Gross tons, f.o.b. vessel, Hampton Roads.
† Advance over previous week shown in **heavy type**, declines in *italics*.

Geological Survey. As compared with January figures exports fell off 37 per cent, New England coastwise, 19 per cent, and bunkering 25 per cent. Tonnage destined to Tide in February was distributed as follows:

Destination	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
Coastwise to New England..	130,000	28,000	50,000	310,000	.....	518,000
Exports....	.....	60,000	92,000	527,000	33,000	712,000
Bunker.....	318,000	29,000	42,000	234,000	3,000	626,000
Inside capes	.....	136,000	67,000	31,000	1,000	235,000
Other tonnage.....	561,000	1,000	1,000	44,000	4,000	611,000
Total....	1,009,000	254,000	252,000	1,146,000	41,000	2,702,000
Total Jan.	1,328,000	371,000	383,000	1,625,000	38,000	3,745,000

The Government Fuel Yard at Washington has advertised for 143,000 tons of bituminous from Maryland, Pennsylvania or northern West Virginia; 76,000 tons from New River and 1,600 tons of gas coal for use in government departments in Washington, bids to be opened March 18.

ANTHRACITE

Production for the first week of March, although larger than in the week of Washington's Birthday, amounted to 1,917,000 net tons, or 4.6 per cent short of the week ended Feb. 19, the last full-time period.

Some uncertainty yet persists in the matter of company schedules of domestic coal for April. As yet but one large shipper has announced a spring reduction of 50c. on family sizes, the others standing firm on winter prices. However, it is intimated that several of the large companies may this week follow suit, but it is clear that there will be no unanimous action this month on summer discounts.

COKE

Production of beehive coke during the week ended March 5 touched a new low level of 181,000 net tons. Virtually no market exists. The blast furnaces are running so light that sales of Connellsville coke hardly can be forced. No interest is shown in the offers of coke producers to cut their contract prices to enable furnaces to get into operation again. The action of the largest independent of making an 18 per cent wage reduction is not expected to be followed by other independents, as these are standing firm awaiting action of the Frick Co., which usually sets the pace in wage adjustments.

Reports From the Market Centers

New England

BOSTON

Inquiry Light—Trade Watchful of Developments—"Distress" Coal Absorbed with Difficulty—Anthracite Price Situation Very Much Mixed.

Bituminous—Buyers show little interest in the current market. One large utility for which bids were solicited in February for any part of 300,000 tons has not yet made any purchase for any but temporary needs. The steady scaling down of prices on Government business leads consumers here to believe there is every inducement for waiting. It is hard to see how there can be anything more than scattering demand between now and June 1, although much depends on the general industrial situation. Reserves are fully as large as in the spring of 1919 and it remains an open question whether the bulk of steam coal for New England will come all-rail as last year or whether Pocahontas and New River agencies will be able to regain something of their tonnage in years previous.

A lot of 1920 business is expiring this month but so far the trade has done nothing but try to keep informed. Conferences this week are likely to make somewhat clearer the attitude of West Virginia operators who ship via Hampton Roads. Recent bids as low as $3 per net ton at the mines for No. 1 Pocahontas show the drift of the contract market and since such prices have been named for 12 months there is small chance of carrying through any base price of $4 and over.

A very few shippers have sent coal forward on consignment with the usual disastrous outcome. There are cargoes here of Pocahontas and New River on which bids of less than $7 alongside have been urged. It is also reported there are 2,600 cars on the B. & O. alone without destination. These are not factors that inspire confidence.

Loadings at all piers are extremely light. While there are still heavy accumulations at Norfolk and Newport News, the aggregate dumpings are smaller than ever. Both offshore and coastwise there is such a dearth of orders that average output is on less than a 40 per cent basis.

Current prices are shown in the Weekly Review.

Anthracite—Except for scattering inquiry on egg and stove there is almost nothing doing at wholesale. Retail stocks are small, but deliveries are at a low ebb, and there is no uneasiness anywhere except over the dull outlook. Buyers are settling back with the comfortable feeling that all the domestic sizes are going to be in ample supply and that 1921 will see a buyers' market throughout the season. Nowadays there is more anthracite required, however, and mining days that are lost because of no market will not be easily made up.

Dealers here would take on coal now if they had more assurance there would not be a material reduction in prices later on. One of the large producing interests has announced a price 50c. less on broken to pea effective March 15 but certain other producers have strongly intimated they could not this year see their way clear to modify the present circular. The public expects a marked reduction but the public does not understand that the complete fading away of any demand for steam sizes has a most important bearing on prepared coal.

Tidewater—East

NEW YORK

One Company Announces Anthracite Reduction — Domestic Coals Move Slowly—No Demand for Bituminous—Few Inquiries Regarding Contracts.

Anthracite—An announcement of a 50c. reduction in the prices of domestic coals, effective March 15, was made last week by one of the largest producers. It was also accompanied by a cut in the prices of steam coals. The reduction in the price of buckwheat was 60c.; rice, 50c. and barley, 75c.

There is little demand. Premiums for independent coals have disappeared. Dealers from New England last week told local wholesalers that unless producers reduced prices on April 1 they would not be able to do their usual summer business and that consumers would not see the necessity of putting their winter coal in before fall.

Retail yards here are well stocked but salesmen say the line trade could take considerable more coal. Pea coal is being moved with difficulty and some shippers are looking for offers. Steam coals are a drug and prices will have to be reduced to meet bituminous competition. The independent coals are hard to move. Buckwheat of good quality was quoted $2.50@$3.25; rice, $1.75 @$2.50 and barley from 75c. up.

Current quotations for company coal per gross ton are as follows:

	Mine	Tide
Broken.....	$7.10@$7.75	$9.71@$10.36
Egg.....	7.10@ 7.75	9.71@ 10.36
Stove.....	7.35@ 8.10	9.96@ 10.71
Chestnut.....	7.45@ 8.10	10.06@ 10.71
Pea.....	5.65@ 6.40	8.12@ 8.87
Buckwheat.....	3.50@ 4.25	5.97@ 6.72
Rice.....	2.50@ 3.50	4.97@ 5.97
Barley.....	1.50@ 2.25	3.97@ 4.72

Quotations for domestic coals at the upper ports are generally 5c. higher.

Bituminous—With demand slow and buyers refusing to do any contracting there was little doing. The efforts of producers to keep the market from being overstocked has prevented a further lowering of prices. While there is con-

siderable coal at the docks it is not hard to handle and shippers are not bringing new tonnage to Tidewater unless there is a market for it.

Salesmen say that large consumers have sufficient coal on hand to last them for at least another month or six weeks and are not likely to come into the market before that time. Operators are not inclined to lower their contract quotations, which range around $3.75 for Pool 10; $4 for Pool 9 and $4.25 for Pool 1. Lower grade coals are being offered 25c. to 50c. less.

In the local harbor there is very little inquiry for bunkering. Because of the slack demand the strike of the boatmen inaugurated March 10 because of a wage cut had little effect on the situation.

There have been but slight changes in mine quotations which are shown in the Weekly Review. Quotations f.o.b. this Tidewater follow: Pool 1, $6.25@$6.50; Pool 9, $5.90@$6.15; Pool 10, $5.75@$6; Pool 71, $6@$6.10; Pool 11, $5@$5.25.

BALTIMORE

Optimistic Attitude Despite Market Stagnation—Contract Prices Strong—Spot Demand Flat at Low Prices.

Bituminous—While the "atmosphere" in nearly every line of business here, and this includes the coal trade, is optimistic for a change for the better in the near future, and a line of inquiry for products is gradually opening, it can not be denied that at present the fuel industry is wretchedly flat.

Whether it be for steam, gas or anthracite coals, the story is the same, as there is not even a fair demand. At the pool here is standing a daily average of around 2,000 cars, but this is of little interest as dumpings have dropped to around 300 to 400 cars a day. One day the past week, for the first time since before the war, not a single ship was reported either at the Curtis Bay pier or waiting astream for coal.

The most encouraging feature of the situation has to do with contract prices, the best steam coals being held here at $4 and better for any considerable delivery over an extended period, some closings being up to $4.50 for specialized coals. The spot market is exceptionally weak, and while best steam coals are selling $2.75@$3 in many cases, there has been an increase in sales of first class coals as low as $2.50. Medium grades are offering $2.25@$2.35, and poorer fuels at $2, with but few takers. Gas coals remain pretty well out of the trading. The export movement from Baltimore for the first seven days of March was 28,199 tons cargo and 1,911 tons on bunker account.

Anthracite—Hard coal men have not much of a story to tell other than that they are ordering little because they have sufficient supplies to carry them through March. The public is not buying in any quantity.

For the future the trade is still figuring on present retail prices being the spring schedule. Dealers are convinced also that the public, hit by the business depression, and with probably no inducement of a price cut in April, will be slow in putting their orders on the books.

PHILADELPHIA

Anthracite Unsettled by Uncertain Prices — Independent Prices Shade Down—Retail Figures Tend to Break—Bituminous Is Unimproved — Prices Firm—Coke Quiet.

Anthracite—Trade is now very much unsettled. Due to unusually mild weather buying has almost ceased and retail yards are becoming quite filled up. The retail business is also greatly hindered by the uncertainty as to prices on April 1. At least two of the large companies are on record as saying that no reduction can be expected, and it is intimated that one of them might even try to increase the price, as it will be necessary to cut heavily on steam sizes to compete with bituminous.

Independent shippers have considerably reduced their prices. Pea coal is selling at company price of $6.40, and some shippers in particularly urgent need of a market are selling at $6.25. There is even some egg, stove and nut being sold at less than company prices. Average independent prices are as follows: egg $8.10, stove and nut $8.35.

Retail buying was considerably curtailed last week when a newspaper made an announcement that retail prices would drop 50c on April 1. While no reliable basis can be found for this statement, it has for the time effectually stopped most orders for storing for next season. Another feature is that some dealers anxious for business show a tendency to shade prices. For several months $14.25 has been an average figure for family coal delivered in cellars, and $12.25 for pea. These prices are now being cut from 25 to 50c., and just recently it was rumored that one big retailer contemplated a cut of $1.

Steam sizes remain weak and Independent producers are especially hard hit trying to move their output. Company mine prices per gross ton for line shipment and f.o.b. Port Richmond for Tide are as follows:

	Line	Tide
Broken	$7.75	$10.45
Egg	7.75	10.45
Stove	8.05	10.70
Nut	8.05	10.70
Pea	6.40	8.80
Buckwheat	3.50	6.00
Rice	2.50	5.00
Boiler	2.00	4.40
Barley	1.50	4.00
Culm	1.50	3.90

Bituminous—Production is steadily growing less, and the demand shows no tendency to increase. Even though big consumers are cutting fairly well into their stocks, they make but little effort to replace the coal that is used. Some inquiries are heard for contract prices, but producers show little inclination to recede from their stand for $4.50 for the very best coals in big tonnages. Spot prices remain unchanged and are shown in the Weekly Review.

Coke—With production light, buying continues unchanged. Some big users have made inquiry for fuel recently, attracted by the price, but very little business has been done. As to prices, 75-hr. is held $5.75 and 48-hr. $5.50.

HAMPTON ROADS

Inactivity Continues — Prices Soft — Dumpings at Low Figure.

Inactivity in all lines marked the coal trade, only 234,793 tons being dumped at all three terminals during the first ten days in March. Under normal conditions this figure would have been approximately double.

Prices of Pools 1 and 2 ranged $5.75@$6, with some orders being filled at even lower figures. Other pools have showed practically no activity, their prices ranging $5.25@$5.50 per ton.

The following ships cleared from this port with coal cargoes during the week ended March 11:

Jap. SS Kaikyu Maru, for Amsterdam, 11,123 tons; Am. SS Eastern Importer, for San Diego, 7,837 tons; Br. SS Fanteem, for Cape Town, 1,597 tons; Am. SS Robin Adair, for Rio de Janeiro, 8,948 tons; Am. Schr. Tifton, for St. Georges, 909 tons; Br. SS Bisley, for Buenos Aires, 5,919 tons; Braz. SS Lages, for Coquimbo, 6,715 tons; Br. SS Berwindvale, for Havana, 7,815 tons; Br. SS Taransey, for Alexadria, 6,118 tons; Br. SS Butetown, for Amsterdam, 3,467 tons; Am. SS Bar Harbor, for Ensenada-de-Moro, 1,078 tons; Br. SS Sidlaw Range, for Dunkirk, 5,735 tons; Nor. SS Smaragd, for Kingston, 1,084 tons; Ital. SS Olona, for Buenos Aires, 2,350 tons; Br. SS Avonmede, for Argentina, 5,435 tons; Br. SS Kelsomead, 4,381 tons.

BUFFALO

Bituminous Slow as Ever—Prices Very Weak—No Prospect of Early Improvement—Plenty of Anthracite — Lake Loading Begins.

Bituminous—One of the unfavorable features of the trade is that railroads are not in position to buy much of anything. Shippers do not feel as though they can sell to them safely at present. They have always been slow pay, but now there is not much promise that they will or can pay at all as they are not earning a profit.

Private consumers will not buy more than they need at any price. The big piles of coal, whether in rail yards or elsewhere, are running down, so that buying will need to increase before long, even if business does not revive. There are plenty of people who hold that the present stagnation will continue till wages come down.

The bituminous market is very unsteady. Late quotations are $3.50 for Youghiogheny gas, $3 for Pittsburgh and No. 8 lump; $2.60 for mine run and $2 for slack, to which add $2.36 for Allegheny Valley coal and $2.51 for all other for freight. Considerable coal is selling even lower than these figures.

Anthracite—The supply has now run up and the Lake-shipping companies are beginning to take tonnage. It will be a month or more before sailing is resumed. Business is so slack in all industries that an effort will be made to delay the opening till well toward May. At the same time a slow opening is no indication of a poor season. The need of coal at Upper Lake ports

is just as great as ever and if business is poor generally it ought to make a low-freight route all the more popular.

Only a few cents premium is now paid for independent coal and this will disappear soon. The report that standard prices would come down next month has kept people from buying, but shippers give out no information. An unauthorized report, said to come from a leading company, has been made lately to the effect that no reduction would be made.

Some little local competition is showing among the larger companies, which may or may not mean something. Not only is there a difference of half a dollar or so, but the appeal of consumers for protection against the big putting-in charge (75c.@$1 per ton) is now heeded in a way that reduces this expense one-half.

Coke—The market continues dull. Local byproduct plants are running on very short time. Jobbers do not get many orders, either for beehive or byproduct. Furnaces are running on short time and are not ready to anticipate a market that is not yet in sight. The only favorable condition is that the good stock of iron ore laid in last season has been used up so that there is a smaller supply at Lake Erie ports than there was a year ago. Coke prices are $5.75 for 72-hour foundry, $5 for 48-hour furnace, $4 for stock and $6 for domestic sizes.

Northwest

MINNEAPOLIS

Colder Weather Aids the Market—Less Distress Coal — Strenuous Efforts to Reduce Carry-Over.

There has been an occasional touch of cold weather for some days past, resulting in a little increase of consumption, but no material help to the wholesale trade, so far as current business is concerned. Of course there will be ultimate benefit, for all consumption reduces stores which would otherwise continue to stand against further business, and it is true that there has been a distinct improvement in the cleaning up of coal in transit and in local yards. But what has been lacking was any snap to the market, any eagerness to buy.

Prospects for the opening market are regarded variously. Some jobbers confidently believe that they have seen the worst prices on coal—the lowest—that they will see. They look to see the new season open a little higher than some current prices, and to have a steady advance during the summer. There are those who prophesy another car shortage with all the attendant ills that go with it, including a coal scarcity. But there is also the argument that the trend is generally downward and there must be a mighty force to go against this.

There is considerable discussion as to the amount of coal which will be remaining on the docks April 1. Present indications are that there will be less hard coal than a year ago, when the total was very small. And there will doubtless be much less bituminous. This minimizes the amount of loss taken on dock coals, though some of the loss has been taken already, since the slump in prices which has prevailed during the last few weeks.

It has been expected that there would be a steady improvement in the industrial demand. There was a turn for the better a short time ago, but it does not seem to be gaining any impetus. Buying in many directions has been narrowly confined, and has hardly begun to show much improvement.

MILWAUKEE

Mild Weather Market—Little Hope of Betterment—Further Price Cuts Seen.

The fuel business is in a state of chronic dullness with little hope of betterment during the remainder of the usually inclement season. Warm weather has been the order thus far in March. Coal is moving out in very small quantities only.

Soft coal and coke will undoubtedly be shaded in price again before the opening of Lake navigation. Anthracite remains high and will continue to be regarded as high if the usual spring reduction is confined to 50c. per ton. Following are the current prices:

Pitts. Hock. and Yough. screened	$8.25
Pitts. Hock. and Yough. pile run	7.75
Pitts. Hock. and Yough. screenings	7.25
West Virginia screened	8.25
West Virginia pile run	7.75
West Virginia screenings	7.25
Pocahontas screened	13.50
Pocahontas mine run	11.25
Pocahontas screenings	9.00
Smithing	12.50
Kanawha gas, mine run	7.75
Ill. and Ind. screened	7.00
Ill. and Ind. pile run	6.50
Ill. and Ind. screenings	6.00
Anthracite egg	15.95
Anthracite stove	16.20
Anthracite nut	16.20
Anthracite pea	14.35
Anthracite buckwheat	12.65
Coke, solvay egg, range and chestnut	14.50
Coke, gas, nut	13.50
Coke, gas, small nut	12.00

Coal carried in, $1 per ton extra.

Inland West

COLUMBUS

Slightly Better Outlook Has Developed —Immediate Business Still at Low Ebb —Contract Inquiries Increasing.

Coal men report an improved tone to the trade. Although orders have not increased materially, prospects for future business are getting better from day to day and it is believed that the worst of the slump is over. The trade is looking forward to the opening of the Lake season as well as to the time for renewal of contracts.

Inquiries for steam tonnage are coming in in large numbers. It is really surprising how many users want to get quotations, although but few of the inquiries have developed into orders or contracts. It is reported that a year's contract for 100,000 tons was made in Ohio territory for mine run at $3. Prices quoted on large tonnages range $3@$3.35 and in some instances higher. Prices for screenings are not as well defined, although tentative figures are $2.50@$2.75 on long-time contracts.

Domestic business shows no strength in any section. Retail stocks are fairly large and in most cases sufficient for the season. Consumers are laying low and only buying from hand to mouth. Retail prices are unchanged from the previous week.

Steam business is also at a standstill. Reports of resumption have been found to be exaggerated. Automobile concerns are increasing their output to a certain extent. Many large users still have adequate reserves and are not inclined to buy under present conditions. Production is small in all Ohio fields. Spot prices are shown in the Weekly Review.

DETROIT

Trading Is Dull Although Inquiries Increase—Contract Market Is Inactive—Prices Are Firm.

With sales of both steam and domestic sizes of bituminous reduced to a very small amount, the trade appears to have settled down to a policy of waiting for materialization of the long awaited business improvement. The situation is not devoid of encouraging features, as there are daily reports of increasing activity in manufacturing and industrial plants.

With coal consumption greatly reduced there is little demand for steam coal. Some of the jobbers observe a slight increase in the number of inquiries but no corresponding improvement in volume of orders. The sale of domestic is checked by the continuance of moderate temperatures, as well as by the considerable amount of unemployment.

While dealers are not heavily stocked, they are confronting an unsatisfactory condition from the fact that the coal is not leaving their yards with the rapidity customary in previous years.

Little interest is manifested in contracts by either buyers or producers. Users of steam coal have apparently accepted the theory that they will be able to supply their requirements by purchases in the spot market at prices lower than they would obtain in contract negotiations.

Prices show little variation. Lump from West Virginia or Kentucky is quoted $3.75@$4, egg $3.50, mine run $2.75 and slack $2.25. Ohio lump is $3 @$3.60, mine run $2.60 and slack $2.25. Smokeless lump and egg is $6, mine run $3.75 and slack $2.25. With light demand, supplies of anthracite seem ample. Prices are generally steady.

CHICAGO

Retail Price Cut Expected, as New Mine Figures Decline — Spot Market Inactive, but Steam Price Holding.

It is expected that within a short time Chicago retailers will reduce their prices on Illinois and Indiana coal. This reduction has been brought about on account of the new quotations issued by the southern Illinois operators, which

showed a reduction of 65c. per ton on domestic sizes.

A great many retailers have just about cleaned out their yards. These fortunate individuals have gotten rid of their high priced coal, although some of them had to take a very substantial loss in order to accomplish this. It is thought that the retailers will carry only small reserves during the summer months.

The steam situation is very unsatisfactory, although prices are being maintained at fairly reasonable levels. This is only because so little domestic is being sold that the mines have but few cars of the steam grades to offer. Buyers are doing their best to get what they consider advantageous contract quotations. They believe that these figures ought to be based on today's current prices, whereas, the average operator refuses to tie up his tonnage at prevailing prices, preferring to take his chances on the open market in the hope that there will be a better market in the fall, which will enable him to get a higher average during the year.

Eastern operators are making a very strong drive to regain their position in the Chicago market. A number of the large West Virginia companies, producing Pocahontas and New River coals, who have not heretofore been represented in this market, are endeavoring to make connections with Chicago wholesalers. It is the concensus of opinion, however, that eastern operators will not regain much of their old business here.

The main reason why the ordinary retailer is not very friendly toward making a contract or placing an order with eastern operators is the fact that he is running a chance of disappointing his customers after he has worked up his trade, and disappointing customers in times like these, is something that the retail dealer wants to avoid. The uncertainty of this source of supply, as demonstrated last summer, is working against West Virginia producers.

ST. LOUIS

Domestic Business Stagnant — Steam Coal in Better Demand — Spot Buying to Detriment of Contracts.

Domestic business is practically dead due to early spring weather. Retailers are largely out of the market until the present high-priced storage supplies are cleaned up. These are moving very slowly. The industrial situation shows but little improvement although the steam market is somewhat stronger because of the curtailment of domestic production.

There is a shortage of Mt. Olive screenings at present and Standard screenings are not equal to the demand. As the steam sizes went up domestic coals came down. Very little Carterville coal is moving in, tonnage from Mt. Olive is somewhat light, and Standard seems to be the principal coal to be received at the present time. Retail prices are firm. There is no demand for anthracite, smokeless or coke.

Consumers are taking advantage of the low spot prices prevailing and many contracts, which have several months yet to run, are being disregarded.

New quotations are as follows: Carterville domestic, March and April, $3.65, May, $3.85. Mt. Olive prices have been reduced 25c.; contract price for domestic is $3.65, mine run, $3.50.

CINCINNATI

Sluggish Demand Continues—Contracts for New Year Lag.

The market still remains virtually unchanged from the inactive condition which has prevailed for several months. Those plants that have in a measure resumed operations are running but one or two days a week and are buying coal only as the necessity demands. Aside from limited contract shipments there is very little coal being received.

Very few new contracts have been closed. Under ordinary circumstances by the first of March much of this coal has been contracted for. In view of the present low prices and the dull demand, buyers in making inquiries have dwelt on the theory that the current-spot prices should be considered a basis for new contracts.

Mine prices range as follows: Bituminous lump, $3.25@$3.50; mine run, $2.50; smokeless lump, $5@$5.50; mine run, $4.

Dealers quote the following: Bituminous lump, $9.25@$10; mine run, $8.50@$9; smokeless lump, $10.50@$11; mine run, $9.50; anthracite egg, $15@$16.25; domestic egg coke, $14.50@$16.

CLEVELAND

Contract Inquiry Brisker — Spot Market Continues Dead—Production Shows Some Improvement—Heavy R.R. Fuel Bills.

Bituminous—An unexpected show of activity in contract inquiries has created considerable interest in the local trade. Both the railroads and some manufacturing plants are showing interest. The latest development in the trade is believed to reflect the prospect of higher spot prices due to the Lake movement, reduced production, and whatever degree of spring industrial activity develops.

Negotiations are now being based upon contract prices which call for $3.25 for mine run and $3.50 for ¼-in. steam. In the meantime the spot market continues lifeless. Dealers with stocks on hand are endeavoring to move them and concessions are reported in many instances. Spot prices are shown in the Weekly Review.

The coal trade is looking for improvement to come from the new Winslow Act, which releases to the railroads more than $350,000,000 due them under the provisions of the Transportation Act. It is estimated that the roads owe coal producers about $100,000,000.

Production in the Ohio fields has shown some improvement over recent weeks, although operations are still far under normal. More mines have been closed in the Hocking Valley fields. On the whole, output is now about 45 per cent of capacity.

Anthracite and Pocahontas — No changes in prices of anthracite and pocahontas have occurred in the last week, following reductions of the preceding week. The demand continues extremely sluggish, owing to mild weather.

Receipts of bituminous coal at Cleveland during the week ended March 5 were the largest in some weeks. Industrial, 882 cars, retail 556 cars, total 1,439 cars, as compared with a total of 891 cars the previous week.

Retail prices of coal delivered follow:

Anthracite—All grades, $14.50.
Pocahontas—Shoveled lump, $11.40; mine run, $10.30.
Domestic Bituminous — West Virginia splint, $10; No. 8 Pittsburgh, $8.45; Cannel lump, $12.15.
Steam Coal — No. 6 and No. 8 slack, $6.60; No. 6 and No. 8 mine run, $7.50; No. 8 ¾-in. lump, $7.75.

South

LOUISVILLE

Demand for Steam Coal Improving—Mines on Better Operating Time—Some Discussions of Mine Wage Reductions.

Demand for lump has been very slow for the past few days, resulting in screenings being much steadier, and mine run is also moving more freely and at better prices. Mines are now operating about two days a week as a result of better industrial demand, due to old stocks being reduced, and better time in many industries.

It is hoped that the Lake movement will start early this season in spite of the fact that stocks are fairly heavy in the Northwest. Many of the big Lakes buyers are planning to ship early, while prices are low.

Operators are expecting prices to be somewhat better in April and May, and are refusing to accept long contracts except where the price is about 30 per cent higher than spot figures.

Some premature reports have been heard concerning efforts that may be made by the Operators' Association, in western Kentucky, to reduce wages when present contracts expire April 1, 1921. However, the Western Kentucky Coal Operators' Association, which controls about two-thirds of the production of the organized western Kentucky field, has a contract which will run until April 1, 1922.

Prices in eastern Kentucky show an average of around $2 for screenings, $2.65 for mine run; $3.25 for lump and $3.65 for block. Operators are reported to be refusing orders for May deliveries except at about 25c. over present spot quotations.

BIRMINGHAM

Steam and Domestic Markets Inactive — Idleness at Mines More General — Quotations Without Material Change.

The coal market is experiencing the most prolonged and acute dullness known in many years, there being an

almost complete absence of inquiry for steam, and the demand for lump is little if any better. Producers and jobbers profess to see no signs of better conditions in the trade for some time to come. The revival of industry, which does not appear to be imminent, offers the only material relief, the lack of such activity being practically the sole cause of the listless market which now prevails, as interests making favorable price concessions have not been able to book any business of importance. Consumers do not need the coal and will not buy.

The trade is dull with domestic producers at this time also, as winter weather is over and there will be little need for lump for the next several months, retailers having sufficient stocks on hand and contracted for to amply supply their needs. The usual domestic schedules effective April 1 have not as yet been formulated and announced.

Steam and domestic prices are practically without change and are shown in the Weekly Review.

The past week has witnessed the closing down of a number of large mines of furnace interests following the blowing out of several more iron makers in the district. Commercial mines now in operation are working perhaps not over two days per week on the average, and consequently the output as a whole is at a low ebb.

Southwest

KANSAS CITY

Quiet Domestic Market Creates Steam Shortage—Prices Unchanged—Oil Due to Advance.

There is little or no demand for domestic grades and this has resulted in a steam shortage. Production is being curtailed to such an extent that there is hardly enough steam coal mined to care for current requirements.

Notwithstanding the steam shortage, there has been no change in prices. Arkansas lump continues at $6, slack $3.50@$4; Kansas lump, $5.50, mine run $4.50, nut $5, slack $3.75@$4; North Missouri lump $4.50, mine run $4, washed slack $4.05, raw slack $1@$3.15 depending on quality.

No new oil contracts have been made recently. It looks like fuel oil is going off the market and this has a direct bearing on the coal industry. Production has been reduced and it is predicted that oil will take a sharp advance very soon.

West

DENVER

Steam Coal Steady—Lump Drops with Low Demand—Seasonal Prices Announced.

Colorado's storage season opens April 1 with a drop of 85c. on present mine prices in bituminous lump. There is a tendency to undercut this figure already, and some of the mines probably will sell for $5.50, making the cut $1. The general mine price April 1, 1920, was $4.50.

On the basis of $5.65 announced by one of the largest companies, the price will advance 10c. a ton successively in May and June and 15c. in July. This indicates that in August the price may stiffen to the present mine price of $6.50, or at least by September, neither of which are listed.

Retailers have not definitely announced their storage prices, but bituminous lump and nut will be about $1 cheaper than at present, Routt County dropping to $11.50 and southern Colorado to $11. This leaves a gross margin of about $2.50, a cut of 10c.

Bituminous steam is steady at $3@$3.50 f.o.b. mines; in fact, it is getting scarce because of the diminishing sales of lump. Lignite steam is unsteady, Louisville being $2.15 and Weld $1.80, while Monarch is also $1.80 but bringing $4.70 retail against $4.50 for Weld and $4.90 for Louisville.

While Louisville lignite lump at present is steady at $5.25, the mine price of $3.50 for Weld can hardly be maintained, despite the fact that a 50c. cut was accepted Feb. 1. Louisville lump is bringing $9.25 on the retail market, while Weld lump is unsteady at $7.25, some retailers selling for $6.75@$6.95.

News From the Coal Fields

Northern Appalachian

PITTSBURGH

Some Low-Priced Sales Seem to Be Regular Production — No Interest in Contracts — Production Continues to Decline.

The spot coal market remains so narrow that prices are by no means clearly defined. Low-price sales do not stop, and the opinion grows that in many cases the coal thus sold is not really "distress" coal but was produced by the operator with his eyes open. It is the common belief, nevertheless, that the prices done are below the bare cost of production and represent a definite loss. Sales of ordinary steam mine run are not infrequently made at $2, but at the same time good grades of steam mine run occasionally bring up to $2.50. In some instances $2 has been shaded.

Gas coal remains at a good margin over steam, simply because operators prefer to leave the coal in the ground if they cannot secure a margin above cost, since it is an accepted fact that the supplies of good grades of gas coal in the Pittsburgh district are relatively limited.

There are scarcely even tentative negotiations on contracts for the coal year, and April 1 is likely to arrive with many consumers committed to a policy of buying from hand to mouth until prospects become more clearly defined.

Production continues to decline and is perhaps not over 40 per cent of rated capacity. Industrial demand is extremely light, contract shipments being largely to railroads and utilities. The spot market is quotable at $2@$2.50 for steam mine run, $2.50@$2.75 for fair grades of gas mine run and $2.75@$3 for best grades, with 25c. additional for screened gas. There is nothing doing in steam slack or steam screened.

UNIONTOWN

Production at Low Ebb—Lakes Trade Outlook Disappointing—Wage Reduction by Independent Operator.

The industrial situation in the coke region has reached the lowest point in its history. Production is at a low ebb and there is virtually no market for coal tonnage. There is some demand for foundry coke but sales of that grade are usually limited to a carload or two at a time. There is virtually no demand for furnace coke. Quotations for the week are; steam coal, $1.75@$1.85; by-product, $2.50@$2.75 with possibly some sales recorded at $2.25; furnace coke $4.75@$5 and foundry $6@$6.75, with most tonnage moving at the minimum figure.

Both the possibility of any railroad or Lakes business has been dismissed by operators here. Reports received by jobbers who have looked into the possibility of the Lakes trade are to the effect that approximately 4,000,000 tons of coal are yet stored in that territory.

One of the largest independent operators announced a cut, effective March 8, of 18 per cent in the wages of all classes of mine and coke yard labor. The impression prevails that few if any other independents will follow suit. The general opinion is that the remaining independent operators will wait for action by the H. C. Frick Co., who in the past set the pace for wages paid.

CONNELLSVILLE

Stagnation Continues — Furnaces Do Not Even Seek Lower Rates—Foundry Coke Business Very Moderate.

Blast furnace operations are so light, with much fewer than half the furnaces in blast, that sales of furnace coke cannot be forced by price reductions,

yet quotations are lower this week, some standard furnace coke having been available at $4, though $4.50 seemed the minimum a week ago and is still the more common asking price. Spot foundry coke is a shade easier. Last week it was quotable at $5.50@ $6.50 but now the $6.50 quotation has disappeared, practically the best grades being obtainable at not over $6. There appears to be a moderate movement of foundry coke in the spot market, chiefly in single carloads, but actual consumption is less than would be indicated by this circumstance, since so few consumers are receiving coke on contract.

The pig iron market is so lifeless that no issue is raised between furnaces and coke operators as to prices for coke that would be needed to enable furnaces to operate. One large merchant interest has some sliding scale contracts which the coke operators are willing to revise to a more attractive basis, but the furnace interest does not suggest that anything be done on the contracts to furnish a basis for getting any of the furnaces into operation again.

The *Courier* reports production in the week ended March 5 at 90,790 tons by the furnace ovens and 25,540 tons by the merchant ovens, making a total of 116,330 tons, a decrease of 4,490 tons.

EASTERN OHIO

Heavier Production—Lake Trade Slow —R.R. Fuel Inquiries Increase—Prices Firm.

Production for the week ended March 5 is estimated at 280,000 tons or about 45 per cent of potential capacity. These figures embrace practically all tipple operations in the field or approximately 170 mines, and indicate an increase in production of 56,000 tons over the preceding five-day week.

With the exception of a slight stimulus felt for shipment to Lake, the mines generally are marking time. Fuel for railroads constitutes around 50 per cent of present output, many of the contracts for which expire with the close of the month. Some negotiations have already been conducted by carriers looking to next year's fuel supply but figures are so low as to be out of the realm of serious consideration.

Estimates are made that 100,000 tons will be moved to lower docks during the month, about 30 per cent of which will be shipped from eastern Ohio. A slow opening in the Lake trade is anticipated as no chartering for ore-carrying has yet been done nor has there been sufficient contracting to date for coal upon which vessel men can get together and complete arrangements for the season. The question of carrying charges will not be taken up for some time. The present early loading of Lake coal is due to light demand in local trades and shippers are paying the expense of shifting vessels as rates have not yet been fixed.

There is nothing to indicate a general resumption of demand for industrial coal and operators are slow to predict the time when a real improvement in the situation may be expected. Spot prices remain about the same.

CENTRAL PENNSYLVANIA

Production Declines—Contract Market Listless—Collections Are Poor.

Production shows a further decline. The weather has been exceedingly mild; a very pronounced reduction has been noted in the tonnage used by the railroads, and the uncertainty overhanging future business conditions has made the demand practically nil. Many operators are producing coal only to keep their working organizations together until the demand will equal or surpass the supply.

The transition from an acute car shortage to an enormous surplus is now complete. The railroads are very remiss in meeting their fuel bills. Collections in general are slow. Pools 10 and 11 are being offered $2.40@$3 and other grades at a much lower figure.

An average production of 2,235 cars a day is shown by reports for the past week, which represents a reduction of 35 per cent as compared with the December output. Railroads and other large users are conferring with operators relative to contract renewals but few agreements have been closed.

FAIRMONT AND PANHANDLE

Production Declines Further—Low Contract Offers Find No Takers—No Lakes Business in Sight.

FAIRMONT

Producers had even less business during the first week of March. However, the decrease was confined to the Monongahela Ry. section. Contract movement, which was good at the outset, declined rapidly throughout the week. Spot prices were off, but there were few takers among producers. Very little contracting was done, the price of $2.40 @$2.75 offered by railroads being considered by operators as too low. There were no signs of Lakes business.

NORTHERN PANHANDLE

Dearth of orders limited production to 25 per cent of normal. What little spot coal was sold moved off storage piles. Contract negotiations had not reached a point where agreements were being closed; producers and buyers were jockeying for position, but were far apart as to prices.

Middle West

MIDWEST REVIEW

Spring Prices Announced—Contract Market Shows Activity—Reserves Are Dwindling — Spot Market in Better Shape.

Operators supplying coal to the Middle West are now concentrating all their energies and facilities on their contract prospects. Practically 80 per cent of the tonnage moving today is going to industries which are testing out new coals with the idea of placing contracts.

The volume of business is unusually small, in fact, much smaller than the tonnage which ordinarily moves at this period of the year. Franklin County operators published their spring prices a few days ago. We were advised that the opening prices on lump, furnace, and small egg, will be $3.50 per ton. The price on cookstove nut and chestnut, will be $3.40; 2-in screenings will be $3 and 1¼-in. screenings, $2.85. We understand that the contract price for the Franklin County field on mine run will be $3.50 although this quotation has not been verified.

It is expected that operators from other competing districts will have to shade their prices and adjust their contract figures in order to be in line with the pace set by the Franklin County operators.

The industrial situation continues stagnant, but nevertheless, the reserves held in many of the industrial centers are constantly dwindling. This is also proving true in the case of the retailer. Purchases in both the retail and domestic trade have been curtailed so stringently during the past two months that stocks on hand are far below normal. This is about the only encouraging feature of the market anad just came to light the other day after a very careful investigation.

Weather conditions continue very strongly against the coal man, as it was only a few days ago that portions of Illinois, Indiana, and Wisconsin were treated to an old fashioned hail storm of the kind that usually arrives in June or July.

Practically all spot coal has been absorbed by the market and it is now almost impossible to pick up demurrage coal in any of the big railway centers. Operators in Illinois and Indiana much prefer, in the light of recent experience, to keep their coal in the ground until they have an order for it rather than produce it and send it on to some railway terminal, trusting in the meanwhile to the ability of their sales agents to dispose of it.

SOUTHERN ILLINOIS

Screenings in Some Demand—R.R. Tonnage Declining—Domestic Hard to Move — Standard Field Conditions Serious.

Conditions in the Standard field during the first week of March were unusually bad. Railroad fuel tonnage was on the decline and many small mines are arranging to close down for an indefinite period. Screenings are moving fairly well but domestic sizes are almost impossible to sell. Prices are quoted in the Weekly Review. The bulk of the tonnage is moving to St. Louis, but little going to the North and Northwest.

Mt. Olive mines worked about two days a week for commercial operations and little better than three days on railroad fuel. Screenings are moving well. A fairly good tonnage of coal was shipped to Omaha territory. The volume of railroad fuel is easing up.

Domestic coal ranged $3.25@$3.50, screenings $1.75@$2.

The only bright spot in conditions in the Carterville field of Williamson and Franklin Counties is the fact that screenings are moving fairly well, indicating that steam sizes are going to be in stronger demand. The amount of steam coal on track is lighter than for some weeks past. It is almost impossible, however, to move the larger sizes. The tonnage of railroad coal is steadily declining.

Prices are quoted in the Weekly Review. Commercial mines worked about two days a week and the best working time reported was four days.

Duquoin field conditions are extremely bad, mines for the most part working about two days a week. Domestic sizes are selling as low as $3 with mine run below $2.50 and screenings down to $1.75. Railroad tonnage is exceedingly light.

WESTERN KENTUCKY

Steam Demand Showing Improvement —Lump Market Quiet—Contracting Is Slow.

Demand for steam grades is showing improvement, screenings being a little stronger in price, and mine run has moved more freely. Lump coal is in light demand, which is making for smaller production of screenings and is aiding prices of all steam grades.

Operators are not anxious to book much contract business in view of uncertain railroad and price conditions later on, there being an optimistic feeling regarding better prices later in the year. At present it is reported that contract figures are about 30 per cent higher than spot quotations.

The market last week and this week shows no price change. Prepared average is $3.26 on a range of $2.75@$3.50; mine run, $2.50, range, $2@$3; screenings, $1.75, range, $1.40@$2.25.

A fair amount of coal is moving South, with a very fair river movement. Export business, which was showing improvement a few weeks ago, is very quiet just now.

Middle Appalachian

LOW-VOLATILE FIELDS

Prices Weaken with Acceptance of Low Spot Orders—No Contracts Closed—All Markets Inactive.

New River and the Gulf

New River prices softened somewhat in the face of better production in the week ended March 5, as a result of heavier selling at prices that were offering. However, the majority of producers still decline to market their coal at the prevailing low figures. There is still a large accumulation at Tidewater. With the nearness of the new coal year there was no more contract activity than during the previous weeks.

Production in the Winding Gulf region continued at about 25 per cent of normal. There was little or no demand either at Tide or for Inland. Contract orders were all that kept the few mines in operation. About the only production on the Virginian Ry. was for railroad use. The new contract market has been unusually quiet so far.

Pocahontas and Tug River

"No market" losses were running exceedingly high in the Pocahontas region, production not reaching more than 175,000 tons. Not more than a dozen mines were running on a full-time basis. There was a little better call for domestic but demand for all other sizes simply did not exist. Tide accumulations restricted the movement in that direction. Buyers were active in securing contract prices, but no business was reported closed.

Tug River mines worked mainly on contract orders, and even these were diminishing in volume. All operations were limited to two or three days. No spot demand existed in any market—foreign call was quiet and Tidewater terminals had a heavy tonnage on track. Collections were slow, and this added to the general dullness made for generally discouraging conditions in the region.

HIGH-VOLATILE FIELDS

Spot Offers Too Low for Operators—Distress Tonnage Lighter — General Conditions Unimproved—Some Interest in Contract Prices.

Kanawha

Mines with contract orders worked not more than two days in the first week of March, complete idleness existing in the case of such operations without contracts. Production was about on a level with the preceding week.

Contracting was slow, prices offered being no inducement to producers. No signs of activity in Lakes coal have appeared, despite the nearness of the opening of the season. Absence of demand and low prices were responble for an inactive spot market. But little distress coal was offering.

Logan and Thacker

Production in the Logan region was a little heavier, due to better movement on contracts to automobile industries. Some coal was also being mined for storage, but the spot demand was unimproved. Steam price offers of $2 were too low for producers to accept.

Thacker mines did not work more than two days because of a pulseless market. However, but few operations have closed entirely. Contract conditions resembled those prevailing in other fields. Steam prices ranged $2@$2.50.

Northeastern Kentucky

The ouput continued at a low ebb—20 to 25 per cent of potential capacity. Few mines were able to run because of the lack of either spot or contract orders. Screenings were a little firmer, following an even weaker demand for domestic sizes.

Virginia

Lack of even contract orders caused the output to slump to about 40 per cent of capacity. There was nothing tangible about the new contract situation, with producers and buyers still far apart on the price question. The spot market took a bare minimum because of weak demand and price offerings too low for the operator to consider.

Southern Appalachian

SOUTHEASTERN KENTUCKY

More Mines Close—Contract Market Inactive—New Railroad Project.

Arrival of warm weather has forced more mines to close down, due to inability to move block. Stagnation in domestic sizes has forced the price on nut and slack upward. Quotations are running around $4 for block, $3.50 for egg, $3 for mine run, and $2 for nut and slack.

While there is not much demand at these figures, yet they represent about the maximum of decline possible under present operation costs. Many mines have not operated since the first of the year, and the men are getting very anxious to work, although firm in their stand against a reduction in wages. There will probably be much talk, and little action in this matter, until the expiration of the present wage contract next spring.

Many inquiries are coming in as to probable contract prices, but buyers and sellers are at a wide variance and as yet no contracts of any magnitude have been reported closed.

There is considerable talk going round about a new railroad to extend from Middlesboro, Ky., to Williamson, W. Va., but as yet nothing tangible has been done. Such a road would open up a vast expanse of Kentucky's richest coal deposits, and the road will undoubtedly be put through in the next few years. Developments along this line are being closely watched by those who are alive to the possibilities of such a project.

West

UTAH

No Domestic Trade—Coast Market Dull —Production Declining.

Mines are working 35 per cent of capacity. Two weeks ago official figures were a little better. The ideal spring weather prevailing of late has paralyzed domestic demand. People are buying only in very small quantities.

Steam coal finds a poor market. Business on the coast is not good. From inquiries made among some of the leading companies it would seem that there will be no change in miners' wages for a long time.

MINE And COMPANY NEWS

ALABAMA

E. J. Longyear Co. is sinking a circular shaft 16 ft. in diameter and 487 ft. deep for the **Pratt Consolidated Coal Co.** at their mine near Banner.

William T. Sheehan, editor of the Montgomery *Advertiser*, and John W. Durr and Richard M. Hobby, wholesale merchants of Montgomery, have been named by Governor Thomas E. Kilby to gather data in regard to the matters at issue between the coal operators and striking miners. The commission is in session in Birmingham and has received briefs from both the operators and union men, and is also hearing oral testimony from prominent business men disassociated with the coal industry in order to become acquainted with the views and opinions of the general public touching the controversy. After all data has been collected and compiled the commission will submit same to the Governor, who will be the sole arbiter, and whose decision both factions have agreed to abide by, the strike having been called off on Feb. 22 by virtue of this understanding.

COLORADO

The rescue team of Mount Harris assisted in the recovery of two of the five bodies of miners who were killed in the explosion in the **Moffat Coal Co.'s** mine 2 near Oak Creek. The explosion is believed to have been caused by mine dust which was ignited by a windy shot. The bodies were found 500 ft. from the entrance of the mine. S. M. Perry of Denver is president, and R. M. Perry is manager.

ILLINOIS

While many miners are idle, it is planned to build hard roads near West Frankfort to furnish work for the unemployed and all possible street paving will be begun as soon as spring conditions permit. **The West Frankfort Chamber of Commerce** is backing the movement.

The Minonk mine is installing an electric motor. While the work is in progress the mine will be closed.

Directors of the **By-Products Coke Co.**, have declared a special dividend of 10 per cent on the capital stock payable March 25 to stockholders of record March 15.

INDIANA

The Gilmour coal mine, one of the oldest around Jasonville, has closed and the mine will not be worked any more. It has been in operation twenty years, the **Vandalia Coal Co.** having operated it for the last several years. About 200 men were made idle by the closing.

A cave-in of fifty-eight feet of sand and gravel in the shaft of the **Deep Vein Coal Co.**, at Princeton, March 1, will cause the shutting down of the mine for at least thirty days. A company of men had just left the mine when the accident occurred.

William H. Tobin, of Indianapolis, vice-president of the **Sterling-Midland Coal Co.**, and actively engaged in the control and management of the **Consumers Coal Co.**, one of the bituminous coal operators indicted by the federal grand jury on the charge of conspiracy to violate the Sherman anti-trust law, reported to Mark Storen, United States marshal, March 1, and executed a bond for $10,000. His bond was signed by Samuel E. Rauh and Jesse T. Moorman. Mr. Tobin also is one of the 125 operators and miners indicted on the charge of conspiracy to violate the Lever act. He was the first to be arrested in the Lever act case and was the first of the operators to give bond in the new case. Judge Anderson released him under the old bond and permitted him to go on his recognizance. That procedure is contemplated for every man under bond in the first case.

KENTUCKY

Gross earnings of the **West Kentucky Coal Co.**, for 1920 amounted to $4,735,415.77, an increase of 50.84 per cent. Production amounted to 907,376 tons, an increase of 11.84 per cent. The substantial increase in production was made possible largely because of the availability of the company's facilities for transportation by water.

The Banford Coal Co., capital $20,000, has been incorporated by E. G. Biddison, Frank J. Dougherty, Louisville; and E. M. Cox, of Charleston, W. Va. The debt limit is given at $40,000.

The Coal Division of the Louisville Board of Trade gave the first of a series of monthly dinners at the Louisville Old Inn Hotel, on Feb. 26, there being about fifty coal men present, including jobbers, brokers and retailers. A cabaret performance and a "jazz" band, added to the attraction. C. L. Crush, of the Atlas Coal Co., made the arrangements. It is planned to have another dinner on April 2.

It is reported that the **Old Colony Coal Co.**, a Virginia corporation, has closed a deal in Perry County for purchase of 700 acres of coal land on the L. & N., main line, with plans for development work this spring.

The R. C. Tway Coal Co., of Louisville, jobbers and producers, who also operate the **James Coal Co.**, retailers, have added a large building supply department, handling general lines of building materials other than lumber, and operating plants to handle this material in connection with two retail coal yards.

NEW YORK

Waterfront property on the East River, New York City, has been leased for a term of years by **Sinram Brothers,** coal dealers. They will erect a concrete coal pocket and a garage and office building.

Cross libel for $100,000 has been filed in the United States District Court by **Coale & Co.**, against the London and Piraeus Steamship Co. for alleged "abuse of judicial process." The libel was occasioned by a libel filed against Coale & Co., by the steamship company for alleged failure to carry out charter contracts, the steamship company claiming it lost thereby $134,248.70.

OHIO

The Belmont & Fairmont Coal Co., recently organized, has acquired about 500 acres of coal lands near Flushing, and plans for the immediate development of the property. Jonathan Radcliff and James T. Vandegrift head the company.

The Cleveland & Western Coal Co. have recently completed dock facilities at their Johnson mine on the Ohio River at Pipe Creek near Shadyside. Under full operation 2,000 tons per day can be loaded into barges at this new dock which has been constructed primarily to take care of output during times of severe car shortage.

The first loading this season at B. & O. docks, Lorain, began with the steamers "Sonoma" and "W. F. Hart." It is reported that 16 boats have already been loaded at the various lower Lake ports, 9 at Cleveland, 3 at Erie, 3 at Ashtabula and one at Huron, with approximately 140,000 tons. Nineteen additional boats have been named to date to receive cargoes and when loaded it is estimated that an aggregate of 300,000 tons will have been dumped into boats ready to sail when navigation opens.

The Big Vein Coal Co., general offices of which are in Cleveland, which has been operating near Salineville for many years will abandon its mines in April. Approximately 120 miners will be forced to secure employment elsewhere. Lack of coal basins and other faults within the mine have been given as reasons for suspending operations. The company has made an offer to the county to sell its railroad right of way for county road purposes which will be available within three months after operations have ceased and mine equipment removed.

The suit of the **C. G. Blake Co.**, coal dealers, Cincinnati, against the United States Navy Department to recover approximately $22,000 alleged to be due to them on coal requisitions by the Navy Department during the first half of the year 1920, has been taken under advisement by Judge John Weld Peck in United States District Court, following the hearing of testimony on both sides, lasting more than two days.

PENNSYLVANIA

A deal has been closed by the coal firm of **Dunn, Brant & Ziegler,** with headquarters at Shanksville, Somerset County, for a tract of coal land near Clarksburg, W. Va., the consideration being in the neighborhood of $250,000. A number of wealthy men of the state are said to be backing the company. It was also announced that the same company is about to take over a number of valuable tracts in the neighborhood of Shanksville and Lambertsville, for which they will pay another quarter million dollars. These tracts are said to include all the available coal land in that section.

The Lehigh & Wilkes-Barre Coal Co. has declared a 150 per cent cash dividend to stockholders of record Feb. 28. The distribution is being made on $9,210,000 stock outstanding and amounts to $13,815,000, as the stock is of $50 par value. The share of the Central Railroad of New Jersey, which owns 169,788 shares of the coal company stock, is $12,734,100.

A contract has just been closed between the Victor Talking Machine Co., of Camden, N. J., and **Cosgrove & Co.**, Cambria County, for the entire tonnage for the big machine plant. The Victor plant is one of the largest users of bituminous coal in the Philadelphia manufacturing district. In the past about half the coal consumed was supplied by the Cosgrove company which operates twelve mines in the central Pennsylvania field. The company closing the contract let it be known that the entire tonnage was being bought from the Cosgrove company because of that company's adherence to its contracts during the period of terrific demand at high prices during the last year.

The Clinton Block Coal Co., Pittsburgh, has plans under way for a housing development for miners at its properties. About twenty-five one and two-story dwellings will be erected as an initial allotment. D. H. Cannon is general manager.

TEXAS

The American Fuel & Development Co., organized with a capital of $5,000,000, is planning for extensive development and operations on the former properties of the Garrison Oil & Coal Co., recently acquired. It is proposed to increase the output by a large tonnage.

WEST VIRVINIA

W. H. Warner & Co., of Cleveland have secured a lease on 88 acres of Pittsburgh, Redstone and Sewickley coal, the deal involving $80,000. A cash payment of $15,000 was a part of the deal. The deal also provides for a minimum royalty of $12,000 for 5 years. The rate of royalty per ton has been fixed at 15c. for Pittsburg coal and 10c. for Redstone and Sewickley coal. Upon the payment of $60,000 in royalty, the title to the acreage now under lease passes to the leasing company.

No time has been lost by the **Freer Coal Co.** in installing a plant near Birch Run in the Elk River field, Clay County. Much work has been done on driving the entry and arrangements are being made to start work on the tipple and put in siding. Officers of the company are: George G.

Bower, Buchtel, Ohio, president; F. A. Freer of Nelsonville, Ohio and J. M. Shepherd of Los Angeles, California, in charge of development work.

S. E. Ward and associates will engage in the production of coal in Sandy River district. Mr. Ward and his associates will operate under the title of the **Ward Pocahontas Coal Co.**, the new concern being capitalized at $100,000. Others interested are: J. W. Johnson, Iaeger, W. Va.; J. Logan Hill, T. A. Lambert, J. A. Peterfish, Jr., of Welch, W. Va.

Ohio mine operators will develop 750 acres of coal land, and their engineers are now making surveys near Barracksville preparatory to the opening of the mines and the installation of machinery. The **Chesapeake & Ohio Co.** is undertaking this enterprise, and its management is represented by T. H. Johnson, president, Bellaire, Ohio.

Preparations are under way for the beginning of operations in Ohio County by the **Penn-American Coal Co.**, of Pittsburgh, whose certificate of incorporation has been filed in Ohio County. The new concern is capitalized at $100,000. Offices of the company, however, are to be in Pittsburgh, Pa. This company has as its principal stockholders, Lawrence A. Crosby, Orville W. Wood, Walter G. Weighman, Paul W. McQuillen, Horace R. Lamb and Charles McGregor. The same people are also largely interested in the **Windsor Power House Coal Co.**, the principal offices of which will be in Pittsburgh, although the company will operate in Brooke County.

Organization of the **Big Seam Coal Co.** of Williamson with a capitalization of $25,000 presages the development of coal territory in Upshur County. Interested in this company are: J. S. Leedy, G. J. Adkins, H. W. Price, E. W. Price and William York.

The Fairmont & Kittanning Coal Co. has begun operating at its newly opened Bryrer mine near Philippi in the Barbour County field, the first shipment of any coal from the new mine being on Friday, Feb. 18.

A deal has been consummated by the **Home Coal Co.** of Pittsburgh disposing of 167 acres of coal land in the Pittsburgh seam to another Pittsburgh firm. The price for the property sold was $100,000. This property is located on the Charleston Division of the B. & O.

Coal land developments to cost $3,000,000 have been planned by engineers of **Quin Morton** and **W. S. Wood** of Charleston, who are interested in mining 200,000 acres of New River coal in the Meadow Creek district. Nine corporations have leases and their plans contemplate production and shipments upon the completion of the Greenbrier & Eastern Ry., now in course of construction. Electric power will furnish the mining energy. Another development is planned by the **Leckie Coal Co.**, which has purchased 2,800 acres of coal land on Big Clear Creek.

The Robinson & Phillips Coal Co., has acquired the holdings of the **Pittsvein Coal Co.** near Grafton, comprising about 1,500 acres of land, and plans for the development and operation of the property.

Capitalized at $100,000 the **Union Gas Coal Co.** has been organized as a West Virginia coal corporation but with headquarters at Uniontown. Uniontown people as follows are the principal stockholders: James H. Dunn, M. H. Bowman, Benjamin B. Howell, Edward F. Shelby and Robert W. Playford of Uniontown, Pa.

The purchase of 230 acres of Mapletown or Sewickley coal in Cass district of Monongalia County has been consummated by the **Purseglove Coal Mining Co.**, the price paid being $18,180, making a rate of about $80 an acre.

The Maryland New River Co. has sold its leasehold covering 3,500 acres on the north side of New River between Fayette and Hawk's Nest to the **Atlantic Coal & Iron Co.** in which a Mr. Emney of Philadelphia and associates are interested. Title to the land is held by the Boone and Prichard estates. The general understanding is that the purchasing company paid $300,000 for the leasehold. Under the terms of the lease the royalty basis is 10c. a ton. As a result of the change in ownership of the lease ten new openings are to be driven on a four-mile front and many new miners' houses are to be built.

Alex Ronay of Fayette City, Pa., who recently organized the **Savaria Coal Co.** with a capital stock of $300,000, has matured plans for the development of about 80 acres of coal land in Harrison County, the new mine to be near Mt. Clare. It is the expectation of the Fayette City capitalist to begin mining operations just as soon as possible and that will not be difficult because there is a tipple already on the property and a siding ready for use.

WYOMING

The Native Coal Co., has been incorporated. according to articles filed with the secretary of state, calling for the privilege of selling and dealing in coal and coal mines and transporting the products to market. Capital stock, $50,000; principal office, Cody. Directors for the first year are Otto I. Nelson, Emil Boander and J. M. Schwoob.

Personals

The National Coal Association has designated delegates and alternates to attend the Ninth Annual Convention of the Chamber of Commerce of the United States which will open April 27 at Atlantic City. The list of those selected is as follows:

DELEGATES

D. B. Wentz, Pres.,
Stonega Coke & Coal Co.,
Land Title Bldg., Phila., Pa.
Geo. H. Francis, Sec.,
Keystone Coal & Coke Co.,
Greensburg, Pa.
Geo. W. Reed, Vice-Pres.,
Peabody Coal Co.,
Chicago, Ill.
Thos. K. Maher, Pres.,
The Maher Collieries Co.
Cleveland, Ohio.
E. L. Douglas,
1018 Union Central Bldg.,
Cincinnati, Ohio.
P. M. Snyder, Pres.,
East Gulf Coal Co.,
Mount Hope, West Va.
Thos. T. Brewster, Vice-Pres.,
Mt. Olive & Staunton Coal Co.,
St. Louis, Mo.
Allan C. Dodson,
Weston Dodson Co.,
Bethlehem, Pa.
Walter Barnum, Treas.,
Pacific Coast Co.,
10 Wall St., New York, N. Y.
A. M. Ogle, Pres.,
Ogle Coal Co.,
Indianapolis, Ind.

ALTERNATES

J. G. Bradley, Pres.,
Elk River Coal & Lumber Co.,
Dundon, West Va.
Geo. S. Baton,
Greensburg-Connellsville Coal & Coke Corporation,
Pittsburgh, Pa.
J. C. Brydon, Pres.,
Quemahoning Creek Coal Co.,
Somerset, Pa.
Geo. H. Barker, Vice-Pres.,
Maynard Coal Co.,
Columbus, Ohio.
Calvin Holmes, Vice-Pres.,
Blue Diamond Coal Sales Co.
Cincinnati, Ohio.
C. H. Jenkins, Vice-Pres.,
Hutchinson Coal Co.,
Fairmont, West Va.
D. F. Cushing, Pres.,
Iowa Coal Opers. Assn.,
Des Moines, Iowa.
Geo. H. Bartlet,
Victor American Fuel Co.,
Denver, Colo.
R. T. Price, Pres.,
Interstate Coal Co.,
Muskogee, Okla.
W. J. Snyder, Treas.,
American Coal Mining Co.,
Indianapolis, Ind.

F. R. Wadleigh has been appointed assistant to the president of the Tuttle Corporation, New York City, effective March 1, 1921.

R. N. Hosler, superintendent of coal mining section of the Pennsylvania State Compensation and Inspection Bureau, made an address at the weekly session of the safety instruction course of the Pittsburgh Chamber of Commerce. His subject was "The Effect of Schedule Ratings on Reduction of Mine Accidents in Pennsylvania."

By direction of the President, **Dr. Harry A. Garfield,** former Fuel Administrator, has been awarded a Distinguished Service Medal by the War Department. In making the award Secretary Baker said that the medal was conferred for "exceptionally valuable services to the Government as Federal Fuel Administrator during the war."

S. D. Brady, head of the Brady interests, operating on an extensive scale in northern West Virginia, was a business visitor in the Cleveland market recently.

Hugh Gilmore, of Bethlehem, Pa., formerly connected with the Amherst Fuel Co. at Amherstdale in the Logan field and now connected with Weston Dodson & Co., was a visitor in Huntington, W. Va., about the middle of February.

B. R. Guy, district representative of the American Export & Inland Coal Corporation with headquarters at Williamson, has returned from a trip to Eastern markets.

A recent visitor in the Huntington, W. Va., market was **George Thompson,** of Cleveland, representing Pickands, Mather & Co.

Charles E. Sandberg, one of the well known operators of the Kanawha field, with headquarters at Charleston, was a visitor in the Huntington market recently.

C. A. Cabell, general manager of the Carbon Fuel Co. of Charleston, W. Va., has recovered from a very serious illness.

J. H. Huffman, identified with the J. E. Long coal interests of Clarksburg, was a visitor in Cleveland during the latter part of February.

R. P. Bopes, of Coale & Co., New York, has returned to that city after a visit covering several weeks at Charleston, W. Va.

J. J. Forbes, formerly mining engineer in charge of mine rescue car No. 2 of the United States Bureau of Mines, stationed at Ratoon, New Mexico, has been transferred to car No. 5 as coal mining engineer. Mr. Forbes will take charge of the Bureau of Mines work in the Birmingham district.

Traffic News

In hearings on the army appropriation bill before the Senate Military Committee, of which he is a member, Senator Frelinghuysen, N. J., said he would propose a **seasonal freight rate coal bill,** providing for a reduction of 75 per cent of the rate on coal during the summer to induce early purchase and storage of coal.

The President on Feb. 26 signed the Act of Congress permitting partial payments to railroads of funds under the guarantee provision of the Transportation Act. It was urged in the interest of coal companies, among others, whose coal bills are unpaid by the railroads.

The case of the Missouri Pacific R.R. vs. the **McGrew Coal Co.,** involving freight rates, was argued before the U. S. Supreme Court on Feb. 28.

The Michigan Manufacturers' Association has filed a complaint with the Interstate Commerce Commission attacking the coal rate schedule on movements into Michigan and naming 63 railroad as defendants. It accuses the roads of sharp practices in increasing freight rates and charges that if the scale on bituminous coal is permitted to stand, Michigan consumers will pay $1,120,000 more in freight assessments this year than the roads are legally entitled to charge.

The Corona Coal Co., of Birmingham, in a complaint attacks as prejudicial the rates on soft coal from the Warrior coal field in Alabama to destinations in Louisiana in comparison with rates from Brilliant, Ala. and West Kentucky coal fields to the same destinations.

The C. N. Dietz Lumber Co., of Omaha, attacks as unreasonable the rates on soft coal from points in Colorado, Illinois, Pennsylvania, West Virginia and Wyoming to destinations in Iowa, Wyoming and Nebraska.

The Sharon Coal Co., Peoria, Ill., attacks as unreasonable the rates on soft coal from mines in Illinois to Peoria from June 25 to Oct. 5, 1918.

In the case of the **Southern Fuel Co.,** vs. **The Bauxite & Northern Ry. Co.,** et al., the I. C. C. decides that the rate applicable on chestnut coal in carloads from Brewer, Okla, to Bauxite, Ark., was not unreasonable or otherwise unlawful. Complaint dismissed.

In the complaint of the **P. Koenig Coal Co.,** a tentative report of an I. C. C. examiner recommends that the rates on coal from Ohio, Kentucky, West Virginia and Pennsylvania to complainants Seven Mile Road Yard, Detroit, are illegal, and that reparation be awarded.

The I. C. C. has suspended until July 1 proposed increase of 20c. a ton on coal from points on the Cumberland R.R. to Florida points.

In a complaint to the I. C. C. the **Endicott-Johnson Corporation** of New York attacks as unreasonable the rates on bituminous coal from Morris Run, Pa., to Endicott and Johnson City, N. Y.

The Sergeant Coal Co. of Evansville, Ind., attacks as unreasonable the rates on bituminous coal from mines in the Boonville district of Indiana to points in Illinois, Wisconsin, Iowa and Minnesota.

The National Supply Co. of Lincoln, Neb., attacks as unreasonable rates on coke from Terre Haute, Ind., to Coburg and Fontanelle, La., and Adams, Neb.

The commission has authorized the Coal Trade Bureau of Illinois to intervene in the complaint of the **West Kentucky Coal Bureau**, which seeks establishment of joint through-rates from mines of complainant members on lines of the Illinois Central to the Southern Peninsula of Michigan.

In a complaint to the I. C. C., **Swift & Co.**, attacks, as unreasonable rates on coal screenings from points in Illinois to Sioux City, Iowa.

The Lackawanna Steel Co., of N. Y., attacks as unreasonable intra-terminal switching charges at the Ellsworth (Pa.) Collieries Co., on bituminous coal.

The Wasatch Coal Co., Salt Lake, attacks as unreasonable rates on run of mine and nut bituminous coal from mines in Utah to Salt Lake.

The West Virginia Northern R.R. Co., has applied for authority to acquire and operate an extension of its railroad extending to the coal mine of the **Atlantic Coal and Coke Co.**, in Preston Co., W. Va., which will open up new coal fields.

The Wichita Falls & Southern R.R. has been authorized to construct a line from Newcastle, Young County, by way of Graham, South Bend and Eliasville, to Breckenridge, Stephens County, Texas, 44 miles, which will open up extensive deposits of coal in the vicinity of Newcastle.

The Omaha Lumber and Coal Co., has complained against unreasonable rates on anthracite coal from points in Colorado to Omaha, South Omaha and Fremont, Neb., and Kiron and Council Bluffs, Iowa.

Wm. L. Carney, Chicago, complains against unreasonable rates on soft coal from Illinois and Indiana to Chicago from June 25 to Oct. 4, 1918. He also complains against overcharges on anthracite coal from points in Pennsylvania on the Erie to Chicago.

The Central Illinois Light Co., of Peoria, Ill., attacks as unreasonable rates on soft coal from Virden, Girard, Springfield and Bissell, Ill., to Peoria, during Federal control.

Association Activities

Morgantown Coal Club

Finishing touches were put on the organization of the coal club at a meeting held on Feb. 21. As soon as the constitution and by-laws of the new organization, as reported by a special committeee appointed to draft them, were adopted after being slightly amended, the following board of directors was elected: G. L. Rodgers, of the Mon-Scott Fuel Co.; R. R. McFall, of the Southern Fuel Co.; C. E. Gadd, of the Gadd-Shaw Fuel Co.; C. F. Sutherland, of the C. F. Sutherland Co.; J. R. Blackburn, of W. H. Bradford & Co.; M. L. Taylor, of the Morgantown Coal Co.; C. W. Lyons, of the Fuel Corporation of America. On the same day the directors assembled and elected the following officers to serve until the annual meeting in 1922: G. L. Rodgers, president; M. L. Taylor, vice president; R. R. McFall, secretary-treasurer.

Kanawha Coal Operators' Association

Instead of three separate and distinct coal associations in the Kanawha region, there is now only one as the result of action taken at a meeting of representatives of the Kanawha Operators' Association, the Cabin Creek Coal Operators' Association and the Big Coal River Operators' Association, held at Charleston on March 2, all three associations being consolidated and forming the Kanawha Coal Operators' Association, with a membership of 111 companies. The total output of the companies now forming the enlarged association amounts to more than 12,000,000 tons a year. There has been a movement on foot for several months having for its object greater cohesion among the operators of the Kanawha region through the organization of one association but finishing touches were not put on the consolidation until the date above mentioned.

As separate entities the Kanawha Coal Operators' Association, of which Quin Morton of Charleston was president had a membership of 90 companies operating 125 different plants; the Cabin Creek Coal Operators' Association had a membership of nine companies operating 40 different mines and the Big Coal River Operators' Association, of which Lute Hornickel was president, had a membership of 12 different companies with 15 different plants.

Just as soon as reorganization was definitely determined upon, members of the enlarged association proceeded to choose the following board of directors: E. O. Dana, Lute Hornickel, Carl Scholz, C. A. Cabell, W. C. Mitchell, F. O. Harris, W. M. Wiley, Garner Fletcher and Jno. J. Snure.

The directors in turn elected the following new officers at a meeting held on March 3: C. A. Cabell, president; W. M. Wiley, vice president; D. C. Kennedy, secretary-commissioner and John L. Dickenson, treasurer. M. Cabell is the general manager of the Carbon Fuel Co., operating on Cabell Creek and Mr. Wiley, the new vice president, a man active in association affairs is the general manager of the Boone County Coal Corporation. D. C. Kennedy has been the secretary of all three associations.

Action of the board in electing officers was followed by the appointment of new committees, the personnel of such being:

Railroad (Chesapeake & Ohio) T. J. Robson, Herschell Morton and Carl Scholz.

Railroad (Kanawha & Michigan) — Charles Paisley, Frank Harris and John L. Dickenson.

On Grievances—D. H. Morton, Josiah Keeley, John Snure, John McKeever, Mr. Fleugel, Alex Hereford, W. C. Mitchell and Carl Scholz

While awaiting for a revival of business, the members of the Kanawha Operators' Association are devoting much time and thought to the matter of securing a readjustment of freight rates to the Lakes which it claimed are discriminatory.

Trade Catalogs

Standardized Scraper Conveyors. The Jeffrey Manufacturing Co., Columbus, Ohio. Pp. 83; 8½ x 11 in.; illustrated.—Advertiser.

O-B Catalog No. 18 — The Ohio Brass Co., Mansfield, Ohio. Pp. 638; 6 x 9 in.; illustrated. Contains cuts and data on high tension insulators, trolley line materials, rail bonds and tools, third rail insulators, car equipment specialties, etc.—Advertiser.

Garton-Davids and Keystone Lightning Protective Apparatus — Electric Service Supplies Co., Philadelphia, Pa. Booklet No. 175; pp. 62; 6 x 9 in.; illustrated.—Advertiser.

Static Condensers—General Electric Co., Schenectady, N. Y. Bulletin 49714C. Pp. 19; illustrated; 8 x 10½ in.—Advertiser.

The Cooling of Quenching Oil in the Heat Treatment of Steel. The Griscom-Russell Co., New York City. Pp. 29; illustrated. Describes the various quenching mediums and systems used, showing typical installations.

Wires and Cables.. General Electric Co., Schenectady, N. Y. Bulletins 49305-6-7-8-9; 8 x 11 in.; illustrated.—Advertiser.

Acme Angles. Acme Motor Truck Co., Cadillac, Mich. Booklet, 7 x 10 in., illustrated. Pp. 15.

D-C Steel Frame Motors. Triumph Electric Co., Cincinnati, Ohio. Bulletin 2006. Pp. 15; 6 x 9 in.; illustrated.

Recent Patents

Coal Handling Apparatus. James E. Jones, Switchback, W. Va., 1,357,456. Nov. 2, 1920. Filed Nov. 22, 1918. Serial No. 263,672.

Artificial Fuel. Alexander H. Ege, Mechanicsburg, Pa., 1,357,627. Nov. 2, 1920. Filed May 12, 1919. Special No. 296,523.

Mine Locomotive. Wm. W. Sloane, Chicago, Ill., assignor to Goodman Manufacturing Co., Chicago, Ill., 1,358,028. Nov. 9, 1920. Filed May 4, 1920. Serial No. 378,874.

Safety Horn Block and Tripping Mechanism. G. M. Johnson, McDonald, Pa., 1,364,627. Jan. 4, 1921. Filed March 27, 1919. Serial No. 285,158.

Coal-Cutting Machine. Wm. M. Thomas, New York, N. Y., 1,364,903. Jan. 11, 1921. Original application filed July 14, 1915. Serial No. 39,760. Divided and this application filed May 11, 1917. Serial No. 167,857.

Mining Machine. C. S. Oldroyd, Knoxville, Tenn., 1,365,598. Jan. 11, 1921. Filed May 5, 1916. Serial No. 95,690.

Apparatus for Feeding Pulverized Fuel. E. C. Covert, Avalon, Pa., 1,365,663. Jan. 18, 1921. Filed May 31, 1919. Serial No. 300,881.

Mining Machine. Albert Ball, Claremont, N. H., 1,365,881. Jan. 18, 1921. Filed June 20, 1911. Serial No. 634,293. Renewed April 17, 1920. Serial No. 374,752.

Fuel Briquet Manufacture. John F. Lovejoy, New Rochelle, N. Y. 1,366,091. Jan. 18, 1921. Filed Oct. 15, 1919. Serial No. 330,823.

Mining Machine. Clarence C. Perry, Ill., 1,366,096. Jan. 18, 1921. Filed April 21, 1920. Serial No. 375,469.

Obituary

J. F. McKeenan, general manager of the Colorado Fuel & Iron Co., died March 8. Mr. McKeenan was unable to survive an operation performed the day before.

Harvey Furry Grazier of Johnstown, Pa., president of the Grazier Coal Co., the Grazier Coke Co. and the Grazier Supply Co., died recently at Albuquerque, N. M.

Joseph L. Robbins, 65 years old, an active figure in the development of the coke industry in the Connellsville region, who helped to burn the first coke produced, died recently of paralysis at his home at Keister.

Henry Lloyd Herbert, who until 1916 was president of H. L. Herbert & Co. at one time one of the largest retail coal firms in New York City, died in Bridgeton, Barbados, on March 5. Mr. Herbert, who was chairman of the American Polo Association since its formation in 1890, went to Bridgeton on Dec. 10.

Daniel Nichols Davis, 70 years old, formerly a coal operator of Terre Haute, died recently at Martinsville, Ind. Mr. Davis was one of the best known business men in Terre Haute and some years ago went to Muncie, where he was engaged in the iron and steel business.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention in Washington, D. C. June 7. Secretary, G. H. Merryweather, Woodward Bldg., Washington, D. C.

Canadian Retail Coal Association will hold its annual convention April 6 and 7 at the King Edward Hotel, Toronto, Ont., Canada. Secretary, B. A. Caspell, Brantford, Ont., Canada.

The International Railway Fuel Association will hold its thirteenth annual meeting at the Hotel Sherman, Chicago, Ill., May 24, 25 and 26. Secretary, J. G. Crawford, Chicago, Ill.

The National Coal Association will hold its next annual convention at the Waldorf Astoria Hotel, New York City, May 19 and 20, White Sulphur Springs hotel reservations have been cancelled. W. B. Reed, secretary, Commercial National Bank Bldg., Washington, D. C.

New England Coal Dealers' Association will hold its annual meeting March 23 and 24 at Boston, Mass. President, W. A. Clark, Boston, Mass

The American Society of Mechanical Engineers will hold its spring meeting May 23, 24, 25 and 26 at the Congress Hotel, Chicago, Ill. Secretary Calvin W. Rice, 29 West 39th St., New York City.

National Chamber of Commerce will hold its ninth annual meeting at Atlantic City, N. J., April 27, 28 and 29.

National Retail Coal Merchants Association Sixth Conference of Secretaries and Executives to be held at the Baltimore Hotel, Kansas City, Mo., May 15 and 16. For reservations address H. S. Mitchell, New York Life Bldg., Kansas City, Mo.

Congressional Echoes on Coal Affairs

THE NAVY HAS REDUCED its estimate for coal for next year from 894,500 tons to 406,575 tons.

REPRESENTATIVE KELLEY COMPLAINED that the navy had sent coal burners to the Pacific and foreign ports, requiring the transportation of coal, and argued that the coal-burning ships should be in the Atlantic fleet nearer the sources of supply. Admiral People says the coal burners were so stationed because they had lost their military value, and that only about 26,000 tons of coal had been shipped to the coal depot at Cavité. Pocahontas coal has been laid down at Manila at $5.15 per ton, including transportation.

"THE FUEL QUESTION has made almost all of us turn gray," Secretary of the Navy Daniels told the committee. "We have been in a constant fight with the oil and coal people." He said the navy had taken advantage of the commandeering act when the navy could not obtain satisfactory prices, and that it had prevented profiteering. He recommended continuance of authority all the time to the navy to commandeer fuel in order that it could obtain supplies at reasonable prices. He said most of the suppliers had been satisfied with navy prices, only three having appealed to the courts. He said that from 1917 to 1921 the navy paid an average of $2.61 a ton for coal, the prices ranging as follows: Pennsylvania, $2 to $4.24; New River and Pocahontas, $2.09 to $3.93. The purchases during this period covered about 9,500,000 tons of coal.

NEW ENGLAND FUEL & TRANSPORTATION Co. and the Pocahontas Fuel Co. advocated before the House Judiciary Committee a bill, which was reported, to permit private owners of vessels and merchandise to sue the government when their vessels or goods were damaged through collision with government-owned vessels.

THE PRESIDENT HAS SIGNED, thereby making it a law, the act passed by Congress providing for the sale of the remainder of the coal deposits on the segregated lands in the Choctaw and Chickasaw nations of Oklahoma.

REPRESENTATIVE LONGWORTH, OF OHIO, a member of the Ways and Means Committee which will consider the subject in the new Congress, has introduced a tax revision bill, providing for repeal of the excess and war profits taxes and also repealing the war taxes on freight shipments.

THE SENATE MILITARY COMMITTEE in reporting the army appropriation bill to the House retains the House provision authorizing the War Department to contract for coal in advance of appropriations therefor. It changes the authorization to provide for the payment of such coal under contract from funds appropriated for the fiscal year in which deliveries are made, instead of in which contract was made, as provided by the House.

THE NAVAL APPROPRIATION BILL reported to the Senate increased the appropriation for navy fuel from $17,500,000 to $25,000,000; fuel under the Bureau of Supplies and Accounts from $9,000,000 to $9,500,000; fuel for Marine Corps from $590,000 to $1,000,000.

COLONEL HANNAY OF THE QUARTERMASTER GENERAL'S office of the army told the Senate Committee on Military Affairs, considering the army appropriation bill, that it was estimated bituminous coal next year would cost $7.70 and anthracite $8.22 a ton. Members of the committee suggested that the Quartermaster General purchase coal for all branches of the army when it developed that several branches were purchasing independently, and the quartermaster general officers agreed to this. The army estimated that it would need $13,000,000 for fuel next year.

THE SENATE HAS PASSED a bill for the allotment of lands in the Fort Belknap, Mont., Indian reservation, provision being made for lease of coal and other deposits for ten years.

THE SENATE HAS PASSED a bill providing for prospecting permits for four years for not exceeding 2,560 acres on coal lands in Alaska, and giving the permitted the right to a lease for all or any part of the lease if coal is discovered in commercial quantities. The committee eliminated the House provision authorizing an investigation as to connecting the Nome-Shelton system of communications in Alaska with the coal deposits of the Kugruk River, Chicago Creek and the Keewalik Mining district.

SECRETARY OF THE NAVY DANIELS in a letter to the House objects to the Rhode bill authorizing the purchase of all government coal through the Bureau of Mines, on the ground that the navy should continue to be allowed to purchase its coal.

THE SENATE MILITARY COMMITTEE in reporting the army appropriation bill struck out the House provision limiting army purchase of fuel next year to $6,500,000, which will permit the department to buy coal to meet its needs from a lump appropriation of $28,000,000 made for quartermaster supplies.

COAL PURCHASED AT THE Aberdeen, Md., Proving Ground last year by the army cost $10.10 a ton, but army officers in charge of the station hope to get coal for half that amount this year.

MINE UNION REPRESENTATIVES conferred with President Gompers of the American Federation of Labor on Feb. 21 on the Hinchman coal case, involving an injunction against strikes, and discussed plans for remedial legislative action.

ON ACCOUNT OF THE lateness of the session and the fact that there will be several new members on the committee in the next Congress after March 4, the House Committee on Mines and Mining decided not to take up before that date the Rhodes bill to authorize the Bureau of Mines to purchase coal and other fuel for the government service throughout the country.

THE KIWANIS CLUB, of Altoona, Pa., and the Belden Manufacturing Co., of Chicago, have petitioned Congress against the Calder coal-regulation bill.

BEFORE THE HOUSE COMMITTEE ON WAYS AND MEANS in the tariff revision hearings N. D. Moore, of Seattle, representing eighteen coal-mining companies of Washington, favored a duty of 75c. a ton on imported coal, to meet the competition of Canadian coal, imports of which into Washington form 90 per cent of total imports of coal into the United States.

EARLY IN MARCH the Government Fuel Yard at Washington will invite bids for coal. The yard has been oversupplied with bituminous, having 18,000 tons on hand. It recently bought coal as low as $3.25 a ton and had had coal offered at a less price. A high-grade coal, such as that from Somerset and Central Pennsylvania districts, is required. New River coal is used; the price now is $4.50 as against $5.50 formerly.

SENATOR KENYON, OF IOWA, has introduced a bill conferring power upon the states to control intrastate railway rates, and to take away the present power thereover exercised by the Interstate Commerce Commission.

SENATOR HITCHCOCK HAS PRESENTED to the Senate a memorial of the Nebraska Legislature favoring nationalization of the coal industry.

THE CHICAGO RAILWAY EQUIPMENT Co., the Freeport (Ill.) Chamber of Commerce and W. H. La Boyteau, of New York, have petitioned Congress against the Calder coal bill.

SENATOR FRELINGHUYSEN, OF NEW JERSEY, who as chairman of a subcommittee of the Senate Interstate Commerce Committee last session considered coal legislation, is understood to be preparing a speech on coal to be delivered in the Senate in the extra session, and to press his Coal Commissioner and seasonal freight rate bills.

THE FEDERAL TRADE COMMISSION has instituted an investigation of alleged price fixing by the District of Columbia retail coal dealers association, growing out of charges of a dealer during hearings on the Calder bill that he had been driven out of business for selling below the prices fixed by the association.

THE PANAMA CANAL OFFICE reports that in 1920 a total of 651,844 tons of coal were shipped through the Panama Canal from the Atlantic to the Pacific coast.

THE HOUSE HAS PASSED a bill for four-year prospecting permits for coal in Alaska, permits limited to 2,560 acres each, with a right to lease by the permittee if coal is developed. Representative Blanton, of Texas, sought to prevent the passage of the bill on the ground that large interests might control Alaskan coal lands. Representative Mondell, of Wyoming, said the same legislation should apply to coal lands in the United States. Representative Madden, of Illinois, urged the bill on the ground that coal development in Alaska was much to be desired. Representative Ferris, Okla., in urging the bill, said that under present laws Alaska coal lands could not be developed.

IN AN OPINION DELIVERED by Chief Justice White, March 7, the U. S. Supreme Court set aside the verdict of the lower court against the Diamond Coal & Coke Co., charging fraud in obtaining coal lands. The court said the inferences of the lower court as to fraud by the coal company were conjecture and not legitimate.

AMONG THE FINAL BILLS to be approved by President Wilson was one authorizing four-year leases for coal lands in Alaska.

UNDER THE $60,000 APPROPRIATED by Congress for enforcement of the leasing law, the Bureau of Mines will supervise coal lease operations, George S. Rice, chief mining engineer of the Bureau being in charge. A chief mining supervisor will have headquarters at Denver, assisted by a district mining supervisor. The Secretary of Interior has approved operating and safety rules and regulations for coal mining operations under the leasing law, which will be issued shortly.